

MACHINERY

Design—Construction—Operation

Volume 43

AUGUST, 1937

Number 12

PRINCIPAL ARTICLES IN THIS NUMBER

FOR COMPLETE CLASSIFIED CONTENTS, SEE PAGE S28-D

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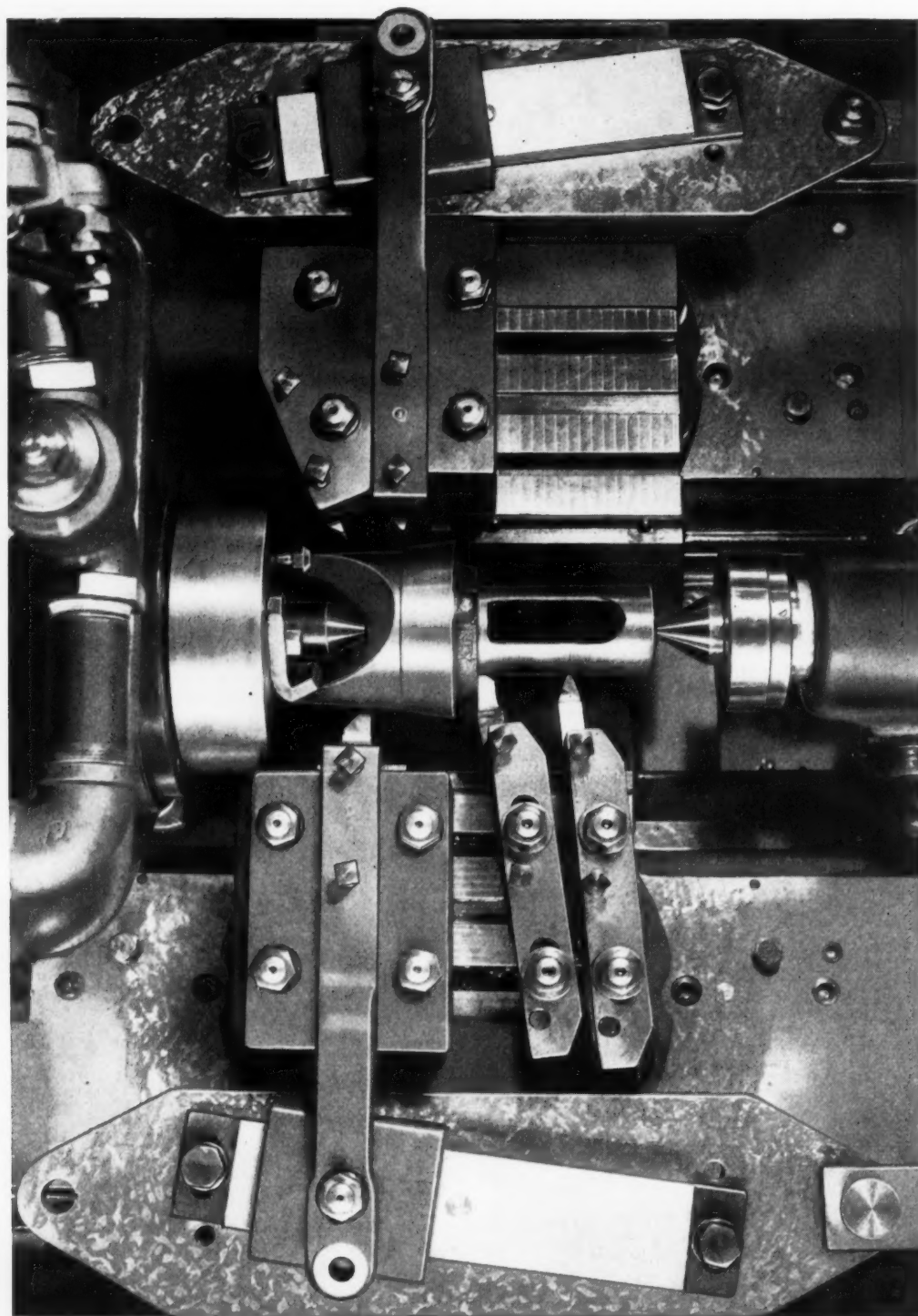
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The **LODGE & SHIPLEY MACHINE**

MACHINERY

Volume 43

NEW YORK, AUGUST, 1937

Number 12



Modern Automatics Set New Pace in Production

Operations on Bar Stock, Forgings, and Castings that Typify the Present-Day Performance Possibilities of Automatic Screw Machines

By CHARLES O. HERB

IMPORTANT changes have been made in the design of automatic screw machines within recent years. Higher spindle speeds, faster indexing mechanisms, and increased power make possible today production rates that eclipse records of only a few years ago. Tooling is more accessible, so that all cuts can be readily observed by the operator and tools changed with ease.

Many cuts that would have required secondary operations on other types of machines can now be combined with standard screw machine cuts. Heavier machine construction has reduced vibration and increased tool life. Improved construction also enables work pieces to be machined to closer dimensional tolerances.

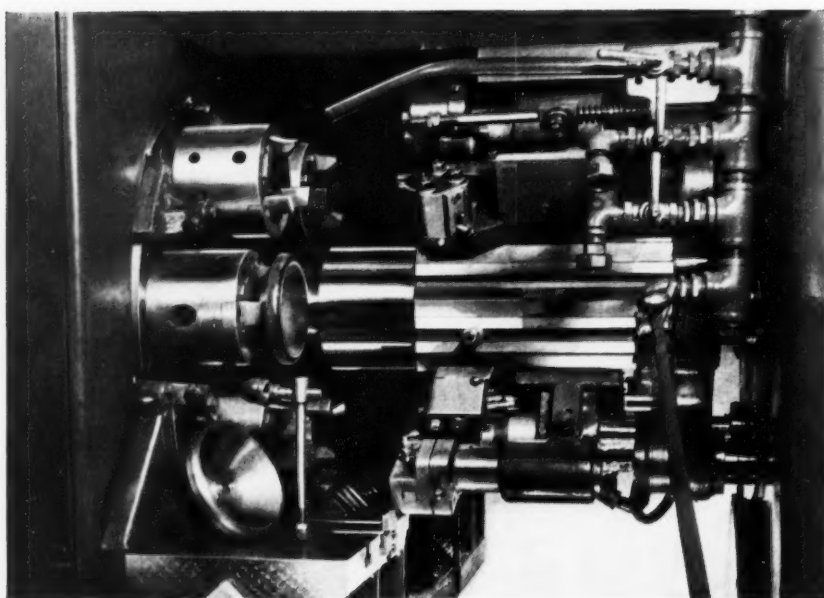


Fig. 1. Chucking Type Gridley Automatic Equipped for Completely Machining the Bowl-shaped End of a Milk Separator Part

Automatic screw machine operations that are typical of up-to-date practice are described in the following. They are performed on Gridley bar and chucking type machines recently built by the National Acme Co., Cleveland, Ohio.

Drilling and Cutting off Threaded Bars to Produce Jack-Screws

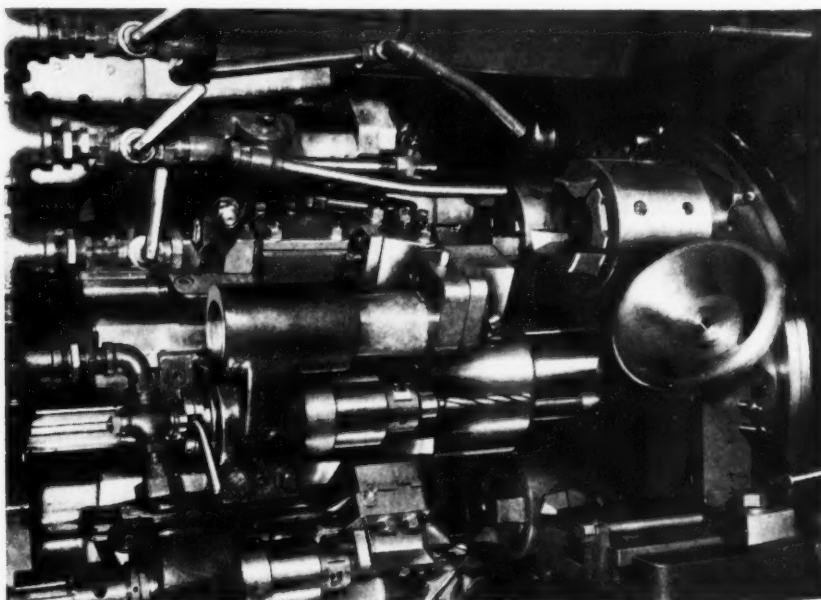
Automobile jack-screws are drilled almost full length and cut off from previously threaded bar stock at the rate of one piece every twenty-one seconds by both of the machines seen in the heading illustration. The diameter of the stock across the top of the square thread is $7/8$ inch, and a $5/8$ -inch hole is drilled almost the entire length of the piece, leaving a wall thickness of only $1/32$ inch between the hole and the root of the thread. This condition necessitates straight drilling in a hole 4 inches

long. The jack-screw is cut off to a length of $4\ 3/4$ inches, a smaller hole later being drilled from the $5/8$ -inch hole to the end of the piece. The material is a high-sulphur free-cutting steel.

As in conventional practice, the stock is fed forward to a stop in the rear bottom position of the machine, and then supported on the overhanging end by a roller support on the main tool-slide. The end of the piece is now spot-drilled by a drill on the main tool-slide, and at the same time, a forming cut $1/4$ inch wide is taken on the piece where it will be finally cut off. This forming cut is taken by a tool on the rear cross-slide.

After the bar has been indexed to the front bottom position of the machine, a second forming cut is taken where the piece will be cut off, by a tool mounted on the front cross-slide, while an oil drill, $5/8$ inch in diameter, on the main tool-slide drills to a depth of about $1\ 1/2$ inches. The overhanging

Fig. 2. Rear Side of the Automatic Illustrated in Fig. 1, which Takes Eighteen Cuts in Less than Two Minutes



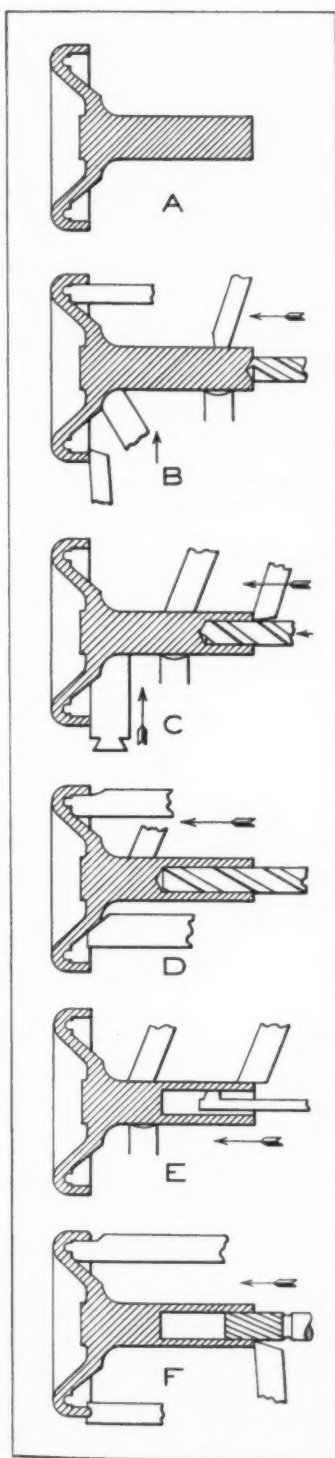


Fig. 3. Diagrammatic Illustrations of the Tools Provided on an Automatic Chucking Machine which Finishes the Stem of a Milk Separator Part

end of the bar is again held in a roller support mounted on the main slide.

The drilling of the part is continued in the front center and front top positions of the machine and completed in the rear top position. The jack-screw is cut off from the bar in the rear center position by a tool mounted on the cross-slide.

Milk Separator Part Machined in Two Automatic Operations

A bowl-shaped steel forging with a stem on one end, as seen at the left front of the machine in Fig. 1, is machined complete, ready to be assembled in milk separators, in two operations in chucking type automatics. The first operation is performed on the stem end and consists of a series of cuts that are illustrated diagrammatically in Fig. 3. The blank part A is loaded in the front center position of the machine, being chucked on the rim of the flange.

In the front bottom position, to which the part is next indexed, tools on the main slide, as shown in diagram B, advance longitudinally to rough-turn the stem one-third of its length, rough-trepan the under side of the flange rim (boring the flange and cutting a groove), and spot-drill the end of the stem. The overhanging end of the stem is supported by a roller on the turning tool holder. At the same time, tools on the front cross-slide rough-face one side of the flange and form a tapered surface where the stem joins the bowl.

In the rear bottom position, tools on the main slide, as seen in view C, rough-turn the stem for another third of its length, drill a hole $21/32$ inch in diameter for a depth of $1\ 1/8$ inches, and face the end of the stem. The turning tool of this group is also of the roller-supported type. At the same time, a tool on the cross-slide finish-faces the flange and forms a tapered surface on the under side of the bowl, as well as a fillet where the bowl joins the stem, all of these cuts being taken by the same tool.

The part is next indexed to the rear center position, where tools on the main slide, as shown at D, semi finish-trepan the under side of the flange rim, finish the remaining rough surface on the under side of the bowl, turn the rest of the stem, and drill the $21/32$ -inch hole for another $1\ 1/8$ inches.

In the rear top position, tools on an accelerated attachment mounted on the main slide, as illustrated at E, finish-turn the stem its entire length, and turn the stem

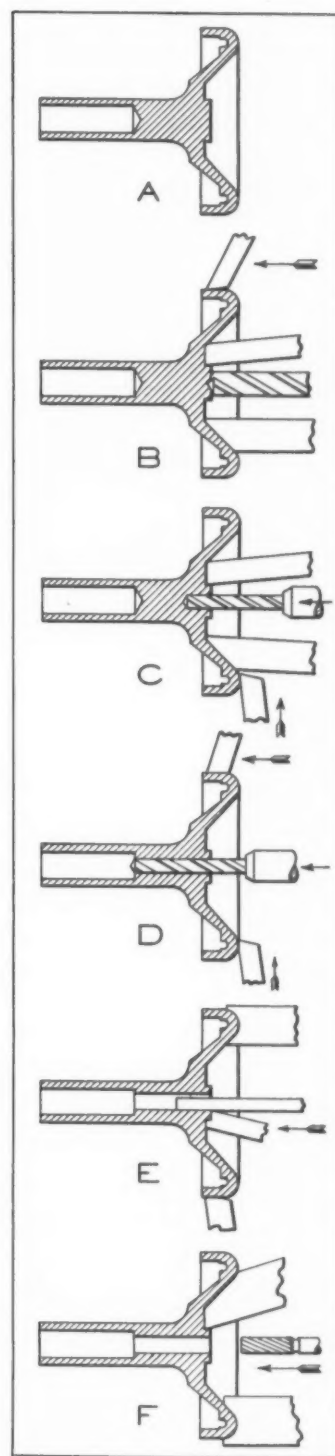


Fig. 4. Tooling Supplied on Automatic Chucking Machine Illustrated in Figs. 1 and 2, for Machining the Bowl-shaped End of a Milk Separator Part

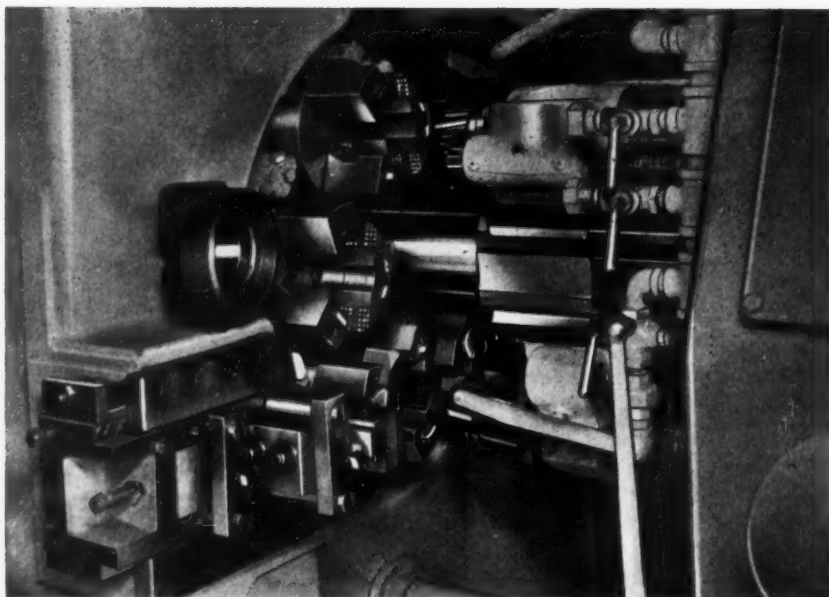


Fig. 5. Malleable-iron Tractor Castings are Rough- and Finish-faced and Bored, as well as Reamed, at the Rate of Practically 100 Pieces an Hour

end for a short distance to the outside diameter of a thread that is cut in a subsequent operation. At the same time, a boring tool, accelerated by the same attachment as the turning tools, finish-bores the hole.

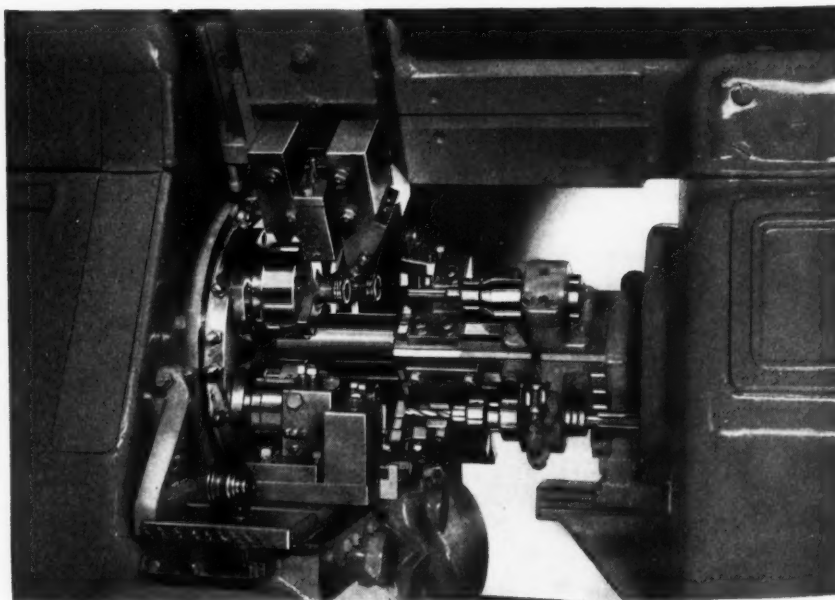
In the front top position, tools on the main slide, as shown in view *F*, round the flange rim, finish-trepan the under side of the flange (boring to a diameter of 5.669 inches and completing the groove), ream the hole in the stem to a diameter of 0.6994 inch, and face the end of the stem. The reamer is operated by an accelerated attachment. The machine cycle in this operation requires two minutes thirty-four seconds, giving a production of approximately twenty-three pieces an hour. All cuts are taken at a spindle speed of 128 feet a minute.

The chucking type automatic used for the second operation on this part is illustrated in Figs. 1 and

2, while the tooling is shown diagrammatically in Fig. 4. The part is chucked in the front center position of the machine, as shown in Fig. 1, being held in a collet by the machined stem and located from the finished back of the flange. When the part is indexed to the front bottom position, the main tool-slide advances the tools shown diagrammatically at *B*, Fig. 4, for turning the flange rim, rough-facing the straight portion of the bowl-shaped surface, rough-forming the tapered portion of this surface, and spot-drilling the boss in the center of the part.

In the rear bottom position, tools on the main slide, as indicated in view *C*, semi finish-face the straight portion of the bowl, semi finish-form the tapered portion, and drill a 1/2-inch hole to a depth of about 3/4 inch in the boss. At the same time, a tool on the rear cross-slide rough-faces the front edge of the flange.

Fig. 6. Four-spindle Gridley Automatic Equipped with Tungsten-carbide Tools for a Series of Turning and Facing Cuts on Small Iron Castings



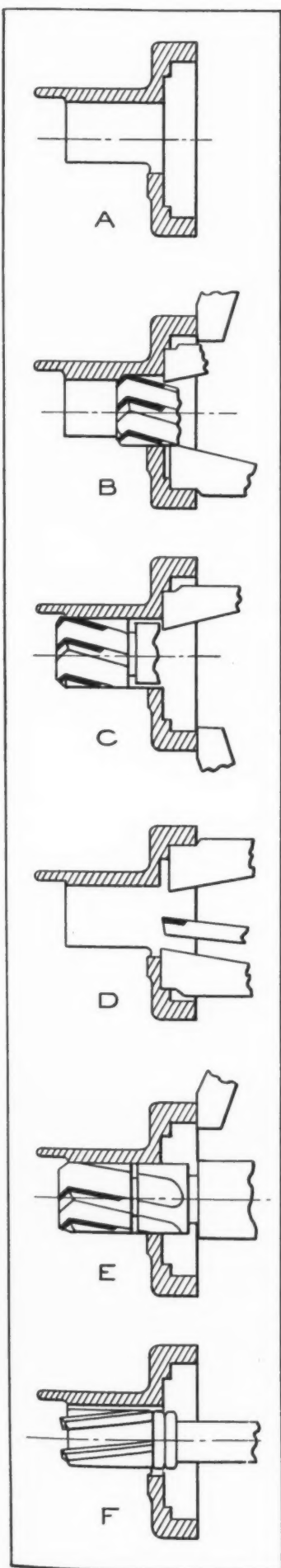


Fig. 7. (Left) Diagrammatic Views of the Tools Provided on the Automatic Illustrated in Fig. 5, which Finishes Malleable-iron Tractor Castings

In the rear center position of the machine, the main slide advances a tool for semi finish-turning the flange, as shown at *D*, and a drill which extends the hole to meet the larger diameter hole produced from the opposite end of the stem in the first operation. At the same time, a tool on the cross-slide finish-faces the flange.

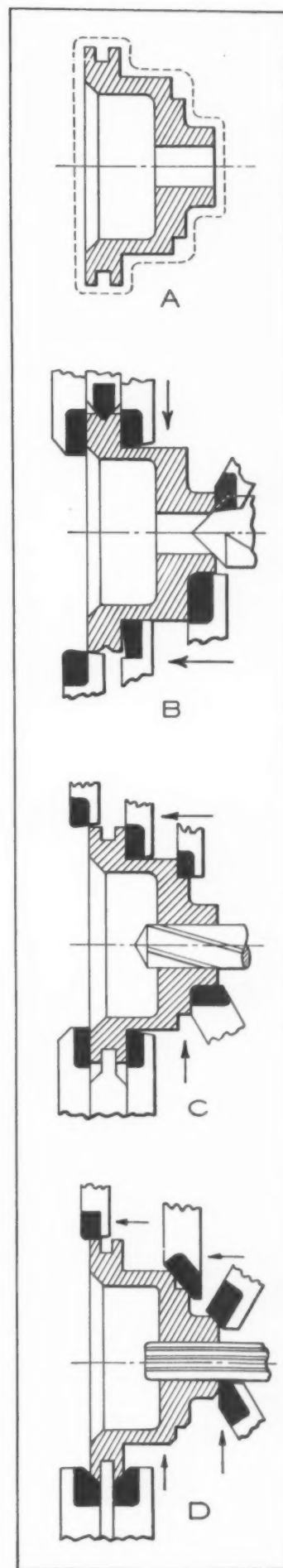
When the part is indexed into the rear top position, tools on the main slide, as illustrated at *E*, round the front side of the flange, finish-turn the flange, finish-face the central boss and bevel its corner, and bore the small-diameter central hole with a Skelton type cutter. This cutter is fed by an accelerated attachment.

In the front top position, tools on the main slide, as illustrated at *F*, finish-form the round face of the flange, finish-form the complete bowl-shaped surface to the hub, and ream the small-diameter hole. The reamer is also actuated by an accelerated attachment. This cycle of operations requires one minute forty-eight seconds, giving a production of approximately thirty-three pieces an hour. The spindle speed in this operation is also at the rate of 128 feet a minute.

Boring, Facing, and Reaming Tractor Parts

Malleable-iron tractor castings of the type seen at the front of the machine chucks in Fig. 5 are bored, faced, counter-bored, and reamed in a chucking type automatic at the rate of one piece in thirty-seven seconds, or ninety-seven pieces an hour. The casting has an over-all diameter of 6 1/8 inches and is 5 1/8 inches long. An important feature of this operation is that the boring tools and reamer take a long intermittent cut, since the central hole becomes a semicircular opening in back of the cup-shaped portion. Carbide-tipped tools are used for taking all cuts, with the exception of reaming, in which case a reamer equipped with Stellite blades is used.

Fig. 8. (Right) Arrangement of the Tooling on the Automatic Shown in Fig. 6 for the High-speed Production of Small Iron Castings for Automotive Applications



The tractor casting is loaded into the machine in the front center position. When it has been indexed to the front bottom position, tools on the main slide rough-counterbore the flange, as indicated at *B*, Fig. 7, rough-counterbore a circular recess, and core-drill the hole for one-half its length. At the same time, a tool on the front cross-slide rough-faces the flange.

In the rear bottom position, tools on the main slide, as indicated in view *C*, semi finish-counterbore the circular recess and core-drill the central hole the remainder of its length. At the same time, a tool on the rear cross-slide semi finish-faces the flange. The casting is next indexed to the rear center position, where the main tool-slide is equipped with a "cat head" holder, on which there are three tools, as indicated at *D*, for finishing the two counterbores and for chamfering the corner of the central hole. The tool that finishes the large counterbore also bevels the corner where this surface meets the face of the flange. The two counterbores are finished to diameters of 4.1875 and 5.288 inches.

In the rear top position, the center hole is bored its full length by means of an inserted-blade cutter on the main tool-slide, as indicated at *E*, which is actuated by an accelerated attachment. The face of the flange is finished by a tool on the rear top slide. The casting now comes to the front top position where the center hole is reamed by means of the adjustable-blade reamer illustrated at *F*, which is carried in the floating holder of the accelerated attachment seen in Fig. 5. This finishes the hole to a diameter of 2.219 inches. The spindle speed for this operation is 210 feet a minute.

Tungsten-Carbide Tools Make Possible High Production of Small Automobile Castings

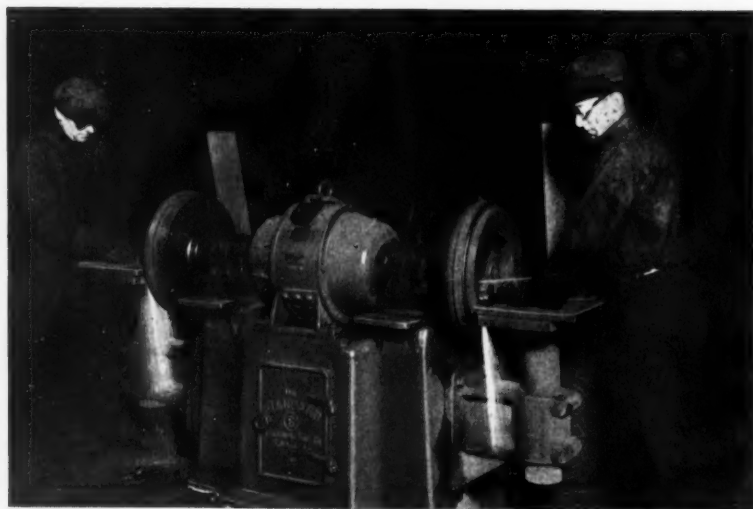
On the front cross-slide of the machine illustrated in Fig. 6 may be seen a small spool-shaped iron casting, one end of which is completely machined from the rough at a rate of 118 pieces an

hour, or 30 1/2 seconds per piece. The cuts are taken in a four-spindle chucking type automatic, completely equipped with tungsten-carbide tools. The spindle speed is 146 feet a minute. The outside diameter of the finished piece is 2 7/16 inches, stock to a depth of 9/16 inch being removed from all surfaces.

This part is loaded into the machine in the rear top position, being slipped over a pneumatically operated expanding collet. The work-spindle is stationary in this position; it automatically starts rotating as the spindle indexes to the rear bottom position, where the part is machined by the tools illustrated diagrammatically in view *B*, Fig. 8. Tools on the main slide rough-turn the flange, the body portion and the hub, face the front end of the body and spot-drill the cored hole. At the same time, tools on the cross-slide rough-face both sides of the flange, rough-form a V-groove in the flange periphery, and rough-face the hub.

The work is then indexed to the front bottom position of the machine seen in Fig. 6, where it is operated upon by the tools illustrated diagrammatically in view *C*, Fig. 8. Tools on the main slide semi finish-turn the flange, finish-turn the body, turn a 1 5/16-inch diameter shoulder in back of the hub, and drill a 0.368-inch hole in the center of the piece. The drill is driven by a high-speed attachment at the rate of 262 revolutions per minute. At the same time, tools on the front cross-slide finish-face both sides of the flange, take a square rough-form cut in the groove, and face the front end of the body.

The final cuts are taken in the front top position by the tools shown at *D*. Tools on the main slide finish-turn the flange and chamfer three corners. It will be observed that two chamfering cuts are taken by one tool. Also, a floating reamer on the main slide finishes the hole to 0.375 inch. Tools on the front top slide simultaneously finish-form the groove in the flange periphery, chamfer both sides of the flange, and finish-face the hub.



Production Costs were Cut 25 Per Cent by the Installation in a Large Iron Works of a Standard Electrical Tool Co.'s Grinder for Grinding Angle-irons and Plates. The 20-inch Ring Wheels Operate at 1750 Revolutions per Minute, or a Peripheral Speed of 9000 Feet per Minute

Paying Investments in New Equipment

Final Article in a Series
Featuring Profitable Installations of Efficient Tool Equipment—Examples from MACHINERY'S Modern Equipment Contest

IN the examples of savings referred to in previous articles of this series, machine tools have been selected, as a rule, because the essential production and cost data usually are obtainable, especially if the machine is producing duplicate parts or if the work is not too varied in character. It is important to note, however, that recent developments in auxiliary tools, work-holding devices, attachments, portable tools, etc., contribute directly or indirectly to increased plant efficiency, and often result in savings out of all proportion to the small investments required.

Magnetic Chuck Reduces Cost at Least 10 Per Cent

A new type of magnetic chuck used in our plant has resulted in substantial savings on every job for which it has been used. For instance, a recent job required the production of twelve pantograph masters—all different and requiring a new angle of set-up for each grinding operation. In comparison with the former method used for jobs of this kind, the following actual savings were made: The saving in grinding wheel cutting amounted to approximately \$1 per master; the actual time saved was approximately \$5 per master. In other words, the total saving was about \$72 for the twelve masters. The elapsed time consumed on the job was a little less than two weeks, and the saving on this one job amounted to 41 per cent of the cost of the chuck.

In our regular run of profile gages, which usually come through from one to six at a time, we have estimated a saving of from 10 to 35 per cent with the use of this chuck. While definite data is not available at the present time, the indications are that grinding operation costs will be reduced at least 10 per cent and the chuck will pay for itself five times in one year.—H. L. GREEN, Reska Spline Products Co., Detroit, Mich.

A New Type of Cutter Pays for Itself in Twenty-Two Hours

The following example of the use of modernized tool equipment illustrates the savings that have been made on a high-speed gear shaper by using a new cutter known as a gap type cutter in place of a standard cutter. The part produced is a small sprocket. It is made from sheet zinc composition, and is about 1/32 inch thick and 5/8 inch pitch diameter. The data covering this part follows:

	Regular Cutter	Gap Type Cutter
Production, per hour.....	210	412
Pieces cut, per setting.....	12	12
Pieces between grinds of cutter	2000	12500
Tolerance, accumulative error	0.001 inch	0.001 inch
Savings: Costs reduced from 0.505 to 0.175 cent per piece.		

The regular cutter used cost \$45; the gap type cutter, \$30, or 33 1/3 per cent less because of the smaller number of tooth spaces. The savings per piece = $0.505 - 0.175 = 0.33$ cent. The savings per hour = $412 \times 0.33 = 136$ cents nearly; hence the new cutter will pay for itself in $30 \div 1.36 = 22$ hours.

Using the gap type cutter also eliminates burring of the sprocket teeth on the lower gear of the set-up. Previously, the burrs had to be removed from one out of every twelve sprockets. In order to equip the machine for use with gap type cutters, it was necessary to provide an automatic tripping device. The cost of this, however, has not been taken into consideration in figuring the cost per piece.—DOUGLAS T. HAMILTON, Fellows Gear Shaper Co., Springfield, Vt.

Savings in One Plant where Worn Parts are Reconditioned by the Metal-Spraying Process

The examples that follow relate to savings accomplished by the application of the metal-spraying process for building up worn parts. The replacement of worn armature shafts costs anywhere from \$125 to \$500, involving stripping from the shaft, core, and commutators, and rewinding and replacing the commutators. Worn journals can be built up by metal-spraying and remachined, without removing any part of the windings or commutator, at a cost of from \$15 to \$20 for the smaller sizes and from \$30 to \$40 for the larger sizes. This method of reclaiming worn shafts has been applied to motors ranging from 5 to 150 horsepower.

The reconditioning of impeller shafts of large centrifugal pump units is another example of saving. The shaft of a 400-horsepower pump was worn very badly at the stuffing-boxes. These shafts were made of heat-treated stainless steel and cost up to \$250 after machining. The worn parts were sprayed and built up with stainless steel and ma-

chined at a cost of about \$35, saving \$215 on each shaft. These reconditioned shafts have been in service about fourteen months and are still in good condition.

The use of the metal-spraying process instead of electroplating is a third example of saving. A large molding apparatus cost \$89.75 to electroplate with zinc and aluminum. The same job cost \$22.32 when sprayed with zinc. We have plated seventy of these molds at a cost of \$6282.50 and sprayed a similar number for \$1562.40. The savings on this one job alone amounted to almost five times the cost of the spraying apparatus. (This comparison of savings with equipment cost does not include the cost of an air compressor or a sand-blasting unit because considerable compressed air is used around the plant and there is also considerable sand-blasting for cleaning off scale, etc.)

Parts machined below size and costing anywhere from \$25 to \$125 can be reclaimed by the application of the metal-spraying process at a cost of \$2 to \$3, and many other examples might be mentioned. Incidentally, the more reclaiming is done, the smaller becomes the scrap pile.—JAMES W. GIBBONS

New Balancing Machine Pays Its Way although Used Less than Forty Hours a Year

The balancing equipment referred to in the following example is used less than forty hours each year, but in this short time, labor costs are reduced sufficiently to cover approximately the depreciation and interest charges. The operation is the balancing of grinding wheel rings. This work was done formerly on an ordinary horizontal balancing way, and the rings were taken to the drilling machine for removing the excess metal. This equipment is about twenty-five years old and we estimate that it could be duplicated for \$50.

The new model static balancing machine now used cost \$714, including the installation and certain additional fixtures. Formerly, 12 minutes was required for the balancing operation, which is now done in 2 3/4 minutes. We have 800 or more pieces to balance annually, so that the new equipment saves annually about 123 hours. The equivalent saving in direct labor equals \$74. If we allow 8 per cent depreciation, the annual depreciation and average interest charge will be covered approximately by the saving in direct labor. These figures are based upon the use of the machine for balancing wheel rings only. At the present time, however, this machine is also being used for balancing faceplates, fans, etc., which results in an additional saving of time. The profit on the investment over and above the depreciation and interest charges will depend, of course, upon the extent to which the idle time of the machine can be reduced by applying it to these various other classes of work.—R. L. RICKWOOD, Superintendent, The Blanchard Machine Co., Cambridge, Mass.

Milling, Drilling, and Boring Attachment Pays for Itself in Less than Eight Months

With a peak of die-sinking work on hand, we had three milling machines with badly worn heads requiring considerable overhauling for which we had no time. An aggressive and enthusiastic salesman came along, expounding the merits of a milling, drilling, and boring attachment. For \$335 we obtained a new six-speed head that is immediately interchangeable on any of the three milling machines. This attachment works in any position and the feed is downward at any angle.

It is difficult to describe briefly the advantages and outline the savings, on account of the varied type of work required in sinking inverted die-casting impressions. However, it is estimated that 25 per cent of the time is saved with this attachment. This is equivalent to \$2.25 per man-day, or \$600 per year gross, from a net investment of about \$350. Allowing for depreciation at 10 per cent and average interest on investment, the net return is approximately 158 per cent.—J. M. DAVIS, General Manager, Union Die Casting Co., Ltd., Los Angeles, Calif.

* * *

The Rendering of Useful Service is the Real Measure of Value

The value of a man in the community is largely dependent upon his ability to cooperate with others in rendering a useful service. In industry especially is this the prime measuring stick. The machinist, the toolmaker, the engineer, and the general manager—their value is measured by their ability to cooperate with others in rendering a useful service. "The politician is the only man," says S. Wells Utley, president of the Detroit Steel Casting Co., "who reaches a position of responsibility and power without any training that fits him for the use of that power. He alone is not required to serve an apprenticeship; he does not have to take a recognized course of study, to pass an examination as to his fitness, or to obtain a license to practice. The veterinary who doctors our horses and dogs is required to show more careful preparation for his calling than the politician who assumes the right to direct not only our industrial, but our personal life."

* * *

In 1902, the Rhode Island legislature adopted a law requiring that "every person residing in this state who shall be the owner of a motor vehicle shall cause the initials of his name to be conspicuously displayed in a suitable place on said motor vehicle, in block letters of not less than 2 inches in height, in order that the owner of such vehicle may be readily ascertained."

MACHINERY'S DATA SHEETS 351 and 352

TABLE FOR CHANGING DEGREES FAHRENHEIT TO DEGREES CENTIGRADE—1

Degrees Fahrenheit	0	10	20	30	40	50	60	70	80	90
	Degrees Centigrade*									
—400	—240.0	—245.5	—251.1	—256.6	—262.2	—267.7
—300	—184.4	—190.0	—195.5	—201.1	—206.6	—212.2	—217.7	—223.3	—228.8	—234.4
—200	—128.8	—134.4	—140.0	—145.5	—151.1	—156.6	—162.2	—167.7	—173.3	—178.8
—100	—73.3	—78.8	—84.4	—90.0	—95.5	—101.1	—106.6	—112.2	—117.7	—123.3
—0	—17.7	—23.3	—28.8	—34.4	—40.0	—45.5	—51.1	—56.6	—62.2	—67.7
0	—17.7	—12.2	—6.6	—1.1	+ 4.4	+ 10.0	+ 15.5	+ 21.1	+ 26.6	+ 32.2
100	37.7	43.3	48.8	54.4	60.0	65.5	71.1	76.6	82.2	87.7
200	93.3	98.8	104.4	110.0	115.5	121.1	126.6	132.2	137.7	143.3
300	148.8	154.4	160.0	165.5	171.1	176.6	182.2	187.7	193.3	198.8
400	204.4	210.0	215.5	221.1	226.6	232.2	237.7	243.3	248.8	254.4
500	260.0	265.5	271.1	276.6	282.2	287.7	293.3	298.8	304.4	310.0
600	315.5	321.1	326.6	332.2	337.7	343.3	348.8	354.4	360.0	365.5
700	371.1	376.6	382.2	387.7	393.3	398.8	404.4	410.0	415.5	421.1
800	426.6	432.2	437.7	443.3	448.8	454.4	460.0	465.5	471.1	476.6
900	482.2	487.7	493.3	498.8	504.4	510.0	515.5	521.1	526.6	532.2
1000	537.7	543.3	548.8	554.4	560.0	565.5	571.1	576.6	582.2	587.7
1100	593.3	598.8	604.4	610.0	615.5	621.1	626.6	632.2	637.7	643.3
1200	648.8	654.4	660.0	665.5	671.1	676.6	682.2	687.7	693.3	698.8

EXAMPLES

—246.0° F = —151.11° C — 3.33° C = —154.44° C.
 2423.5° F = 1326.66° C + 1.66° C + 0.37° C = 1328.61° C.

Equivalent Values of F and C for Interpolation in Table Above

Deg. F.....	1	2	3	4	5	6	7	8	9
Deg. C.....	0.5	1.1	1.6	2.2	2.7	3.3	3.8	4.4	5.0

*All decimals are repeating decimals. For example, the Centigrade equivalent of 300 degrees F. is indicated in the table as 148.8. The last figure "8" being a repeating decimal, the accurate value is 148.888...

MACHINERY'S Data Sheet No. 351, New Series, August, 1937

Based on Tables Published by the National Bureau of Standards

TABLE FOR CHANGING DEGREES FAHRENHEIT TO DEGREES CENTIGRADE—2

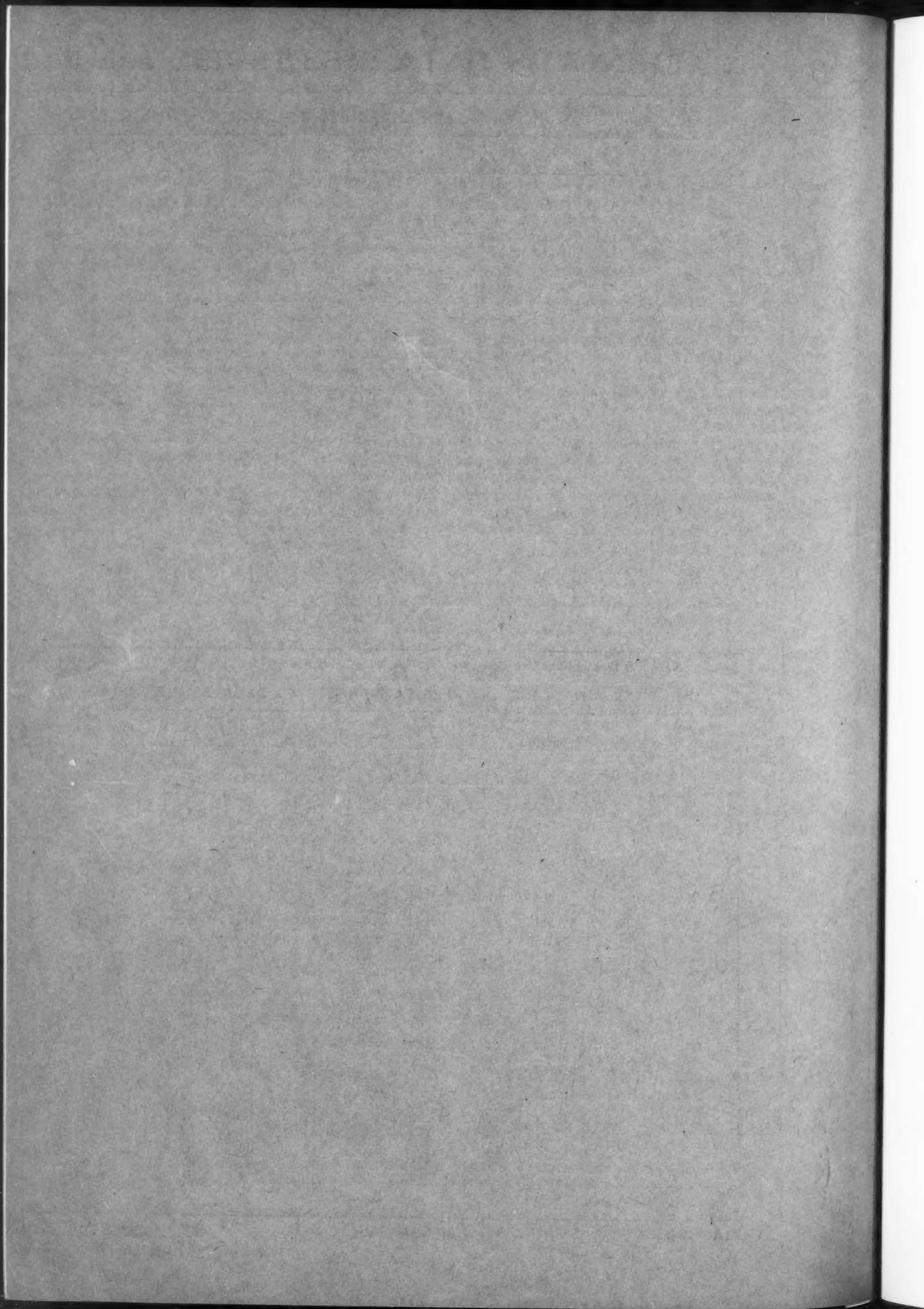
Degrees Fahrenheit	0	10	20	30	40	50	60	70	80	90
	Degrees Centigrade*									
1300	704.4	710.0	715.5	721.1	726.6	732.2	737.7	743.3	748.8	754.4
1400	760.0	765.5	771.1	776.6	782.2	787.7	793.3	798.8	804.4	810.0
1500	815.5	821.1	826.6	832.2	837.7	843.3	848.8	854.4	860.0	865.5
1600	871.1	876.6	882.2	887.7	893.3	898.8	904.4	910.0	915.5	921.1
1700	926.6	932.2	937.7	943.3	948.8	954.4	960.0	965.5	971.1	976.6
1800	982.2	987.7	993.3	998.8	1004.4	1010.0	1015.5	1021.1	1026.6	1032.2
1900	1037.7	1043.3	1048.8	1054.4	1060.0	1065.5	1071.1	1076.6	1082.2	1087.7
2000	1093.3	1098.8	1104.4	1110.0	1115.5	1121.1	1126.6	1132.2	1137.7	1143.3
2100	1148.8	1154.4	1160.0	1165.5	1171.1	1176.6	1182.2	1187.7	1193.3	1198.8
2200	1204.4	1210.0	1215.5	1221.1	1226.6	1232.2	1237.7	1243.3	1248.8	1254.4
2300	1260.0	1265.5	1271.1	1276.6	1282.2	1287.7	1293.3	1298.8	1304.4	1310.0
2400	1315.5	1321.1	1326.6	1332.2	1337.7	1343.3	1348.8	1354.4	1360.0	1365.5
2500	1371.1	1376.6	1382.2	1387.7	1393.3	1398.8	1404.4	1410.0	1415.5	1421.1
2600	1426.6	1432.2	1437.7	1443.3	1448.8	1454.4	1460.0	1465.5	1471.1	1476.6
2700	1482.2	1487.7	1493.3	1498.8	1504.4	1510.0	1515.5	1521.1	1526.6	1532.2
2800	1537.7	1543.3	1548.8	1554.4	1560.0	1565.5	1571.1	1576.6	1582.2	1587.7
2900	1593.3	1598.8	1604.4	1610.0	1615.5	1621.1	1626.6	1632.2	1637.7	1643.3
3000	1648.8	1654.4	1660.0	1665.5	1671.1	1676.6	1682.2	1687.7	1693.3	1698.8
3100	1704.4	1710.0	1715.5	1721.1	1726.6	1732.2	1737.7	1743.3	1748.8	1754.4
3200	1760.0	1765.5	1771.1	1776.6	1782.2	1787.7	1793.3	1798.8	1804.4	1810.0
3300	1815.5	1821.1	1826.6	1832.2	1837.7	1843.3	1848.8	1854.4	1860.0	1865.5
3400	1871.1	1876.6	1882.2	1887.7	1893.3	1898.8	1904.4	1910.0	1915.5	1921.1
3500	1926.6	1932.2	1937.7	1943.3	1948.8	1954.4	1960.0	1965.5	1971.1	1976.6
3600	1982.2	1987.7	1993.3	1998.8	2004.4	2010.0	2015.5	2021.1	2026.6	2032.2

*See note on Data Sheet No. 351.

MACHINERY'S Data Sheet No. 352, New Series, August, 1937

Based on Tables Published by the National Bureau of Standards

MACHINERY, August, 1937—772-A



Hot-Milling—A Method of Finishing Cutting Edges of Rock Drills and Other Tools

MILLING off a small amount of metal from the cutting edges of forged tools while they are still at the forging heat is rather a novel procedure. This process, known as "hot-milling" is used by Holman Bros., Ltd., Camborne, England, in the production of rock drill bits. On ordinary forged rock drill bits, the surfaces are scaled and pitted, with discolored patches which indicate that changes have taken place in the composition of the surface material. Hot-milling removes this coating and exposes the unaffected material, so that the bit can be properly hardened. The hot-milling operation also brings the bits to the correct shape and size. An interesting point is that a lower temperature can be used when hardening a hot-milled bit, as the quenching medium does not have to penetrate the scale and skin left by the forging operation.

Fig. 1 shows a hot-milling machine of the double-cutter type which will handle tools of different lengths or sections of tools having different types of bits. The work is placed on the lower rests, its position being such that when the bit is placed against the teeth of the cutter the cutting edges are 1/16 inch clear of the bit stop. With the cutter, which is about 7 1/4 inches in diameter for the particular bit shown, revolving at a speed of about 3000 revolutions per minute, the work is thrust forward, bringing the V-shaped teeth of the cutter into contact with the sides of the cutting edges of two adjacent wings of the drill bit. As soon as the face of the bit reaches the stop-plate, the work is withdrawn from the cutter, given a quarter turn,

and again thrust forward. This operation is repeated until both sides of each cutting edge have been milled.

From 60,000 to 80,000 bits are usually milled with a cutter before it is resharpened, although as many as 120,000 bits have been milled by one cutter. If milling is done with the work at insufficient heat, the cutter life is materially shortened.

Another interesting operation in connection with the hot-milling machine is hot-reaming, for which the special attachment shown in Fig. 2 is provided. After forging or resharpening a bit from hollow steel, it is necessary to open out the hole. This is usually done with the pneumatic punching machine which operates in conjunction with the forging machine. However, it is sometimes preferable to carry out the operation by reaming, especially in the case of small bits which show a tendency to split with repeated punching. A bracket secured to the main frame of the hot-milling machine carries a supporting bar, and to this is clamped a casing with a sliding sleeve in which a ball-bearing spindle is mounted. At the front end of the spindle is a chuck which holds the reamer, while at the rear end, a friction bevel pulley is attached. Projecting forward from the casing are two bolts which support the stop for the work. In operation, the work is pushed against the stop, thus moving the sleeve back until the two bevel wheels are in contact. This causes the reamer to rotate before it enters the bit, the actual reaming taking place when the cross-head is pushed further back against the pressure of the springs.

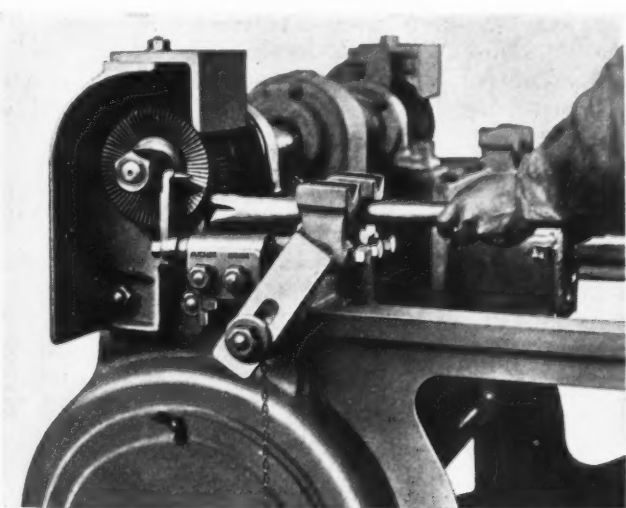


Fig. 1. Hot-milling the Cutting Edges of a Cross-bit Rock Drill

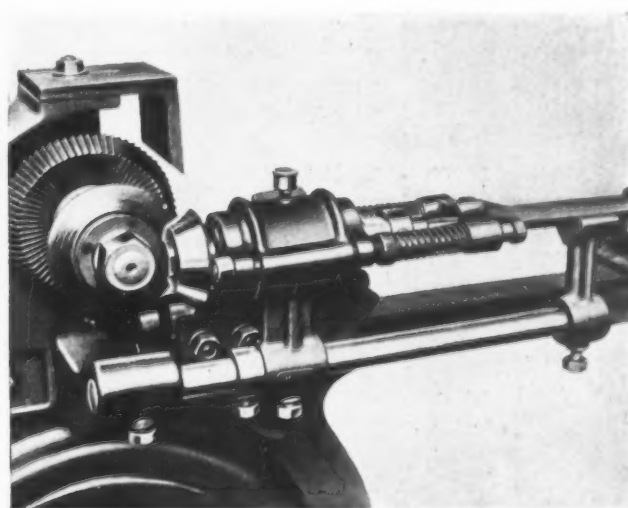


Fig. 2. Hot-reaming Attachment for a Finishing Operation on Rock Drill

Building Accuracy

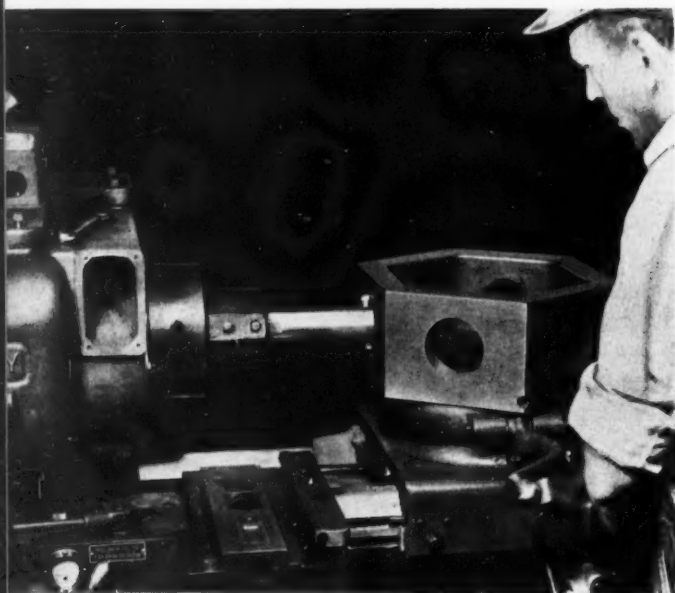
Machine Tool Building Calls for Far Greater Accuracy Today than in Years Past Because of New Cutting Materials and Closer Manufacturing Tolerances



Fig. 5. The Seats for the Bushings of Turret Locking Bolts are Hand-reamed by Means of the Fixture Shown to Insure Accurate Center Distances with Respect to the Turret Post



Fig. 6. The Holes Provided in the Turrets for the Tool-holders are Bored on the Machine on which the Turret is to be Used. Three Cuts are Taken in Finishing Each Hole



IN July MACHINERY, several of the methods used by the Warner & Swasey Co., Cleveland, Ohio, in building and assembling turret lathes were described. In this article, additional machining and inspection methods are dealt with.

An important requirement, as far as the turret is concerned, is that the center distance between the turret post and the seat for each locking bolt bushing in the bottom of the turret be held to close limits. This is accomplished by hand-reaming the seats through the use of the simple fixture seen in Fig. 5, which is slipped over the turret post. The bushings have previously been bored. Reamers of the type seen lying on the skid are employed, the fixture having a long bearing to insure that the bushing holes will be reamed parallel with the axis of the turret.

The same fixture is employed in reaming corresponding holes for the locking bolts in the top of the saddle, but a different adapter is used for attaching the fixture to the saddle.

The holes provided in the turret for the tool-holders are finish-bored after the turret has been mounted on the machine. The operation is performed by using a cutter held on a bar attached to a head which is screwed on the spindle nose. Such an operation is illustrated in Fig. 6, the headstock having been completely assembled prior to this operation. This method of boring the turret holes insures that each one will be directly in line with the spindle when the turret is indexed in actual production operations. Three cuts are taken in finishing each hole. First an inserted-blade cutter is used, and then two single-point tools.

The faces of the turret must be finished accurately at right angles to the headstock spindle, because they are used for locating various tool-holders. The turret faces are therefore also finished after the turret has been assembled on the machine. The turret facing operations are performed by means of the tool-head shown in Fig. 7, which is also mounted on the nose of the machine spindle. This head is equipped with a tool-slide which is fed radially by means of a lead-screw. Each time that the head completes a revolution, star-wheel A strikes bar B, causing a quarter turn to be imparted to the lead-screw. The tool is advanced approximately $1/32$ inch at each revolution of the head.

The bolt holes in the turret faces must be drilled

into Turret Lathes

This Article Describes Some of the Exacting Methods Used by the Warner & Swasey Company in Building Turret Lathes—Second of Two Articles

accurately relative to the tool-holder holes. This is accomplished, as shown in Fig. 8, by clamping a jig plate on the finished turret faces for guiding the drills. The jig plate is provided with a short arbor which is seated in the previously finished turret holes. A bar is used on the inside of the turret for clamping the jig plate to the different faces. A four-spindle head mounted on the spindle nose and supported by the adjusting screws of a unit placed on the turret lathe bed drills all four holes simultaneously in the turret faces. The bushings of the jig plate are checked frequently.

Checking the Alignment of the Turret, Cross-Slide, and Saddle

The alignment of the turret with the machine spindle is accurately determined by means of the simple operation illustrated in Fig. 9. A fixture having an accurately finished cylindrical plug is first bolted on one of the turret faces and then a mandrel is placed in the head that is mounted on the spindle nose. On the overhanging end of the mandrel there is a holder for a micrometer. By means of the micrometer, readings are taken at four points around the cylindrical plug in the manner illustrated, and the plug is adjusted on its holder until a zero reading is obtained at all four points.

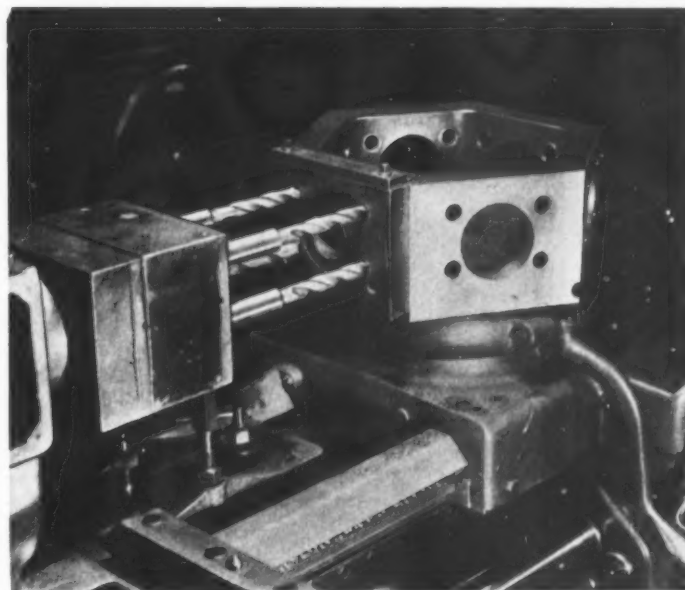
In the preliminary step, a short mandrel is used, so that the turret is located close to the headstock. Then a long mandrel, such as seen in the illustration, is attached to the lathe spindle and similar readings are taken with the micrometer, but with the turret withdrawn about 15 inches farther from the turret lathe spindle. If the micrometer readings are not the same as when the short mandrel was used, the bed ways must be scraped until the readings are zero all around the cylindrical plug with the turret located in both positions.

The alignment of the cross-slide with respect to the spindle of the turret lathe is determined by means of the equipment illustrated in Fig. 10. First, a long straightedge A, provided with a dovetail groove to fit a corresponding tongue on the cross-slide, is bolted on top of the cross-slide. An adapter which holds a bar B about 2 feet long is then attached to the spindle nose. On the outer end of bar B a micrometer is



Fig. 7. Another Operation in which the Turret Lathe "Finishes Itself" — Machining the Turret Faces by Means of a Tool-slide that is Mounted on the Spindle of the Turret Lathe

Fig. 8. The Four Bolt Holes in Each Turret Face are Produced Simultaneously by the Use of a Special Four-spindle Drill Head and a Jig Plate that is Bolted to the Turret Face



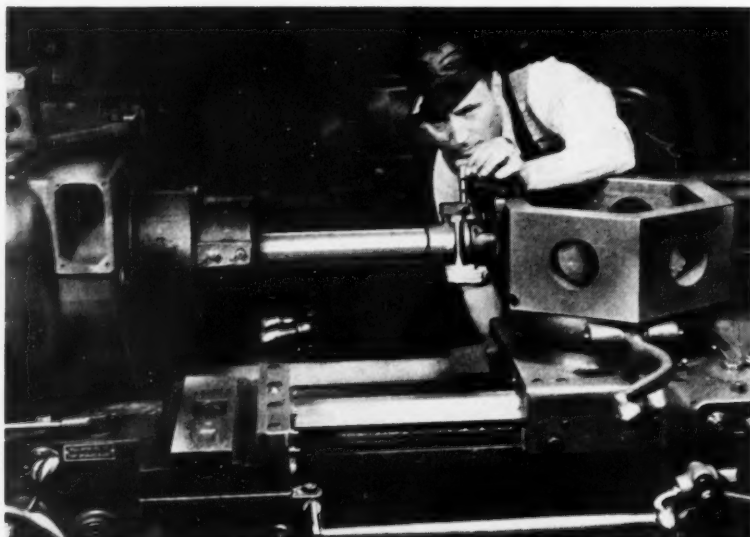


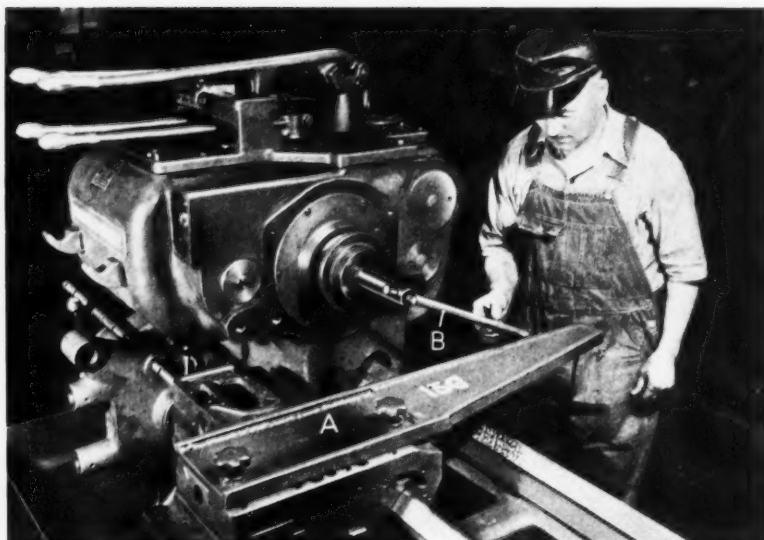
Fig. 9. (Left) Method of Checking the Alignment of a Turret Lathe Spindle with the Bed Ways, Using Long and Short Mandrels

Fig. 10. (Below) Readings are Taken at Points 48 Inches Apart in Determining Alignment of Cross-slide with Spindle

so mounted that its spindle can be brought in contact with the ground face of the straightedge.

After the micrometer has been adjusted so that its spindle can be applied in the manner shown, the machine spindle is revolved through 180 degrees in order to apply the micrometer to the opposite side of the straightedge. The reading must be the same at the two points, which are 48 inches apart. If the reading shows an error, the cross-slide vees are scraped until a satisfactory reading is obtained. The same method is used for checking the turret saddle when it is assembled on the lathe.

When a turret lathe has been finally assembled, it is subjected to an extensive inspection in accordance with a printed form which requires the operation of all mechanisms, levers, etc., and a determination of the alignment of the various important machine members. As a final test, light cuts are taken on three brass disks mounted at both ends and in the



middle of an overhanging arbor, as illustrated in Fig. 11. This arbor is screwed on the nose of the turret lathe spindle. At the end of the operation, the arbor is removed from the machine and the disks are carefully checked for straight turning.

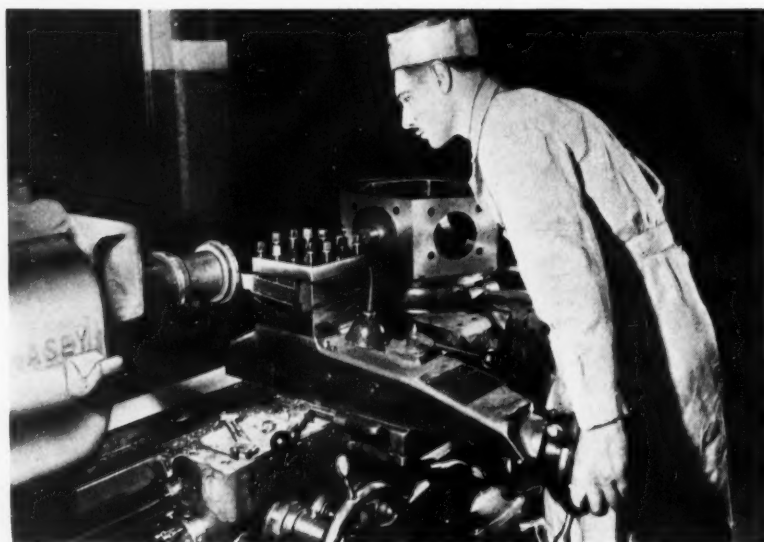


Fig. 11. An Actual Operation is Performed after a Turret Lathe has been Completely Assembled to Determine its Machining Accuracy

The Hydraulic Operation of Machine Tools

Feeding and Traversing Movements of Grinding Machines, Drilling Machines, and Jig-Boring Machines are Obtained by Automatically Controlled Hydraulic Units—Third of a Series of Articles

A HYDRAULIC system for a precision cylindrical grinding machine made by Carl Unger, Stuttgart-Hedelfingen, Germany, is shown in Fig. 9. This machine is semi-automatic in operation, the cycle of operations being started by a single lever which returns to its neutral position when the cycle has been completed.

The grinding wheel is advanced rapidly toward the work, and just before it comes in contact with it, the movement is slowed down to a predetermined feed rate, which continues until the wheel-

slide runs against an adjustable stop. The wheel then dwells in the end position for a given time to permit sparking out, and finally the slide returns to its initial position, where it comes to rest.

The various stages in the cycle are independently regulated by the hydraulic control system, adjustment being obtained by control valves which are centralized on the apron of the machine. The drives to the work-spindle and coolant pump are started simultaneously with the feed movement of the wheel-slide.

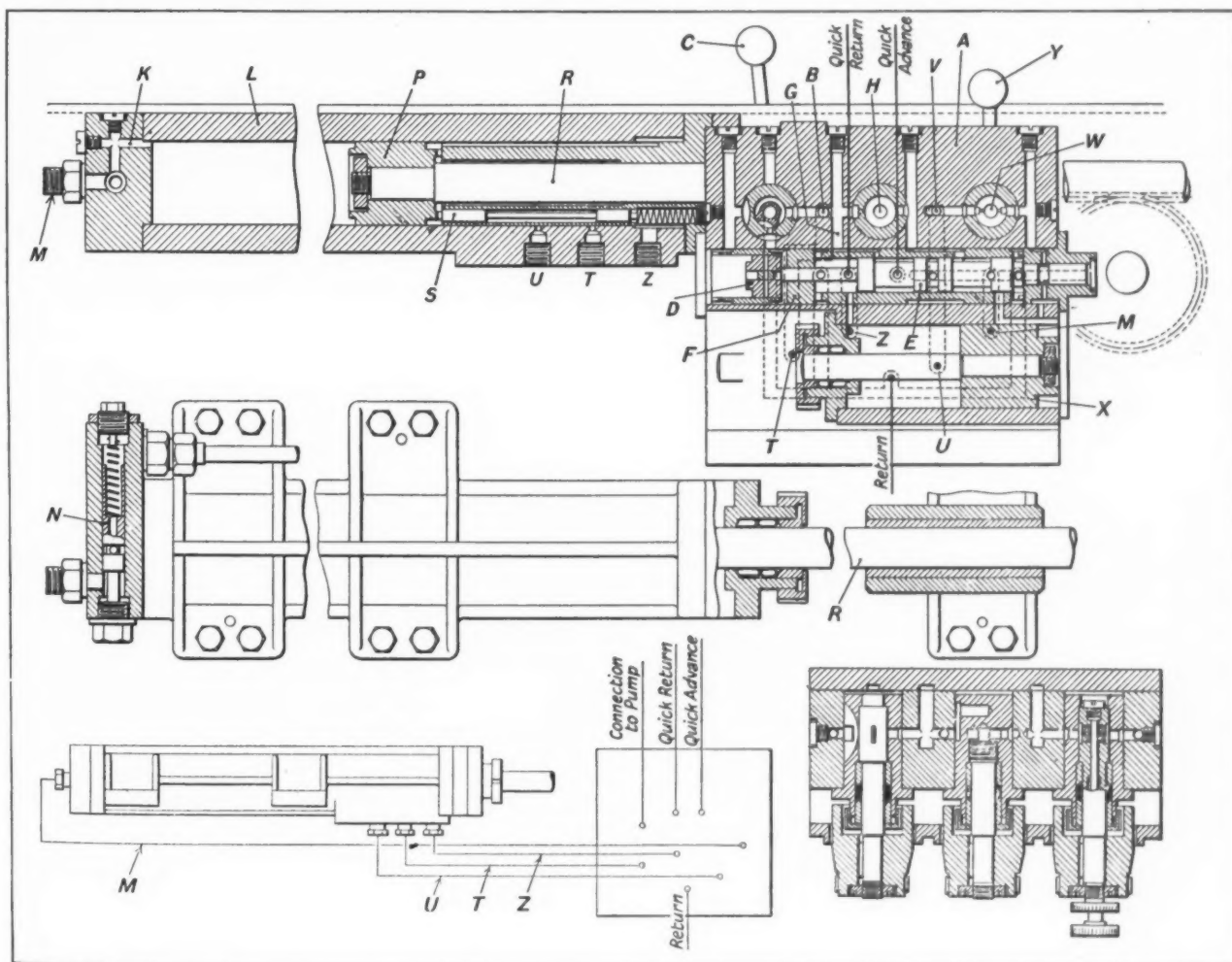


Fig. 9. Hydraulic Control System for Wheel Feed on Grinding Machine

In plunge-cut grinding, the wheel-feed motion is continuous, but in traverse grinding the wheel is fed in at each end of the stroke by predetermined increments. Built-in electric motors are used for the drives of the wheel- and work-spindles, hydraulic oil-pump set, and coolant pump, push-buttons being provided for starting and stopping each motor independently. An additional push-button serves to cut out all the motors.

In the hydraulic wheel-feed control system shown in Fig. 9, oil under pressure enters the control box A at the point B with the main control lever C in the left-hand or starting position, and forces the auxiliary control piston D, which is separated from the main control piston E by a spacer F, into the right-hand end position. Part of the oil is simultaneously by-passed through the channel G, actuating the quick advance, while the oil entering the throttle H passes by way of the piping M and port K into the feeding cylinder L. The differential valve N at the left-hand end of the cylinder does not become effective for the fine adjustment of the feeding piston P until after the rapid advance movement has been completed. The fine adjustment of the wheel-head is effected through a train of transmission members (not shown) in combination with the piston-rod R.

A short time before the piston P reaches the right-hand end of its stroke, the control member S establishes connection between the pipes T and U,

so that the oil entering at V passes, by way of the throttle W and ports in the main control piston E, to the stop-piston X, which initiates the quick return of the piston P by shifting over the main control lever C to the right, after the wheel has dwelt for a predetermined time in the end position for sparking out. Oil admitted to the auxiliary control piston D from the right-hand side forces the main control piston E to the left-hand end position, so that the quick return of the wheel-head and stop-piston X is effected. The lever Y serves to lock the automatic return, which is necessary when dressing the wheel.

Hydraulic Control System for Drilling Machine

A patented hydraulic control system for a drilling machine built by the National Automatic Tool Co., Richmond, Ind., is shown in Fig. 10. In this system, oil is supplied partly from a variable-delivery pump A and from the gear pump B to the piston-valve C, connected to the valve-control mechanism D, which is governed by a foot-treadle by automatic means to give a working cycle.

The gear pump B draws oil from a reservoir and supplies the piston pump A and the low-pressure supply pipe E, surplus oil passing through a low-pressure relief valve to the supply tank. The pump A is of the type in which an increased eccentricity

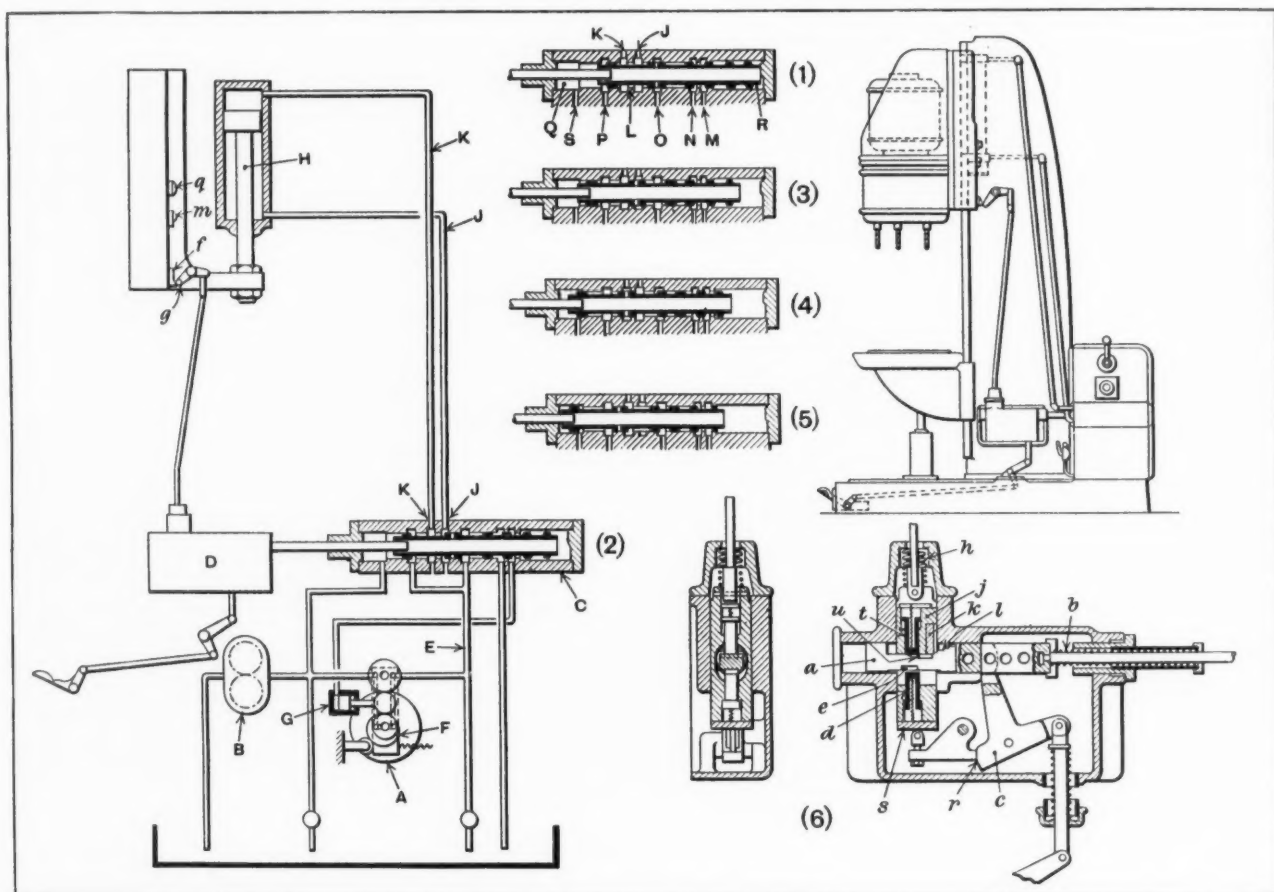


Fig. 10. Hydraulic Control System for Drilling Machine

of the pistons increases the oil supply. This supply is controlled by the lever *F*, which normally tends to assume a small delivery position, but can be actuated by the piston *G* to increase the volume of oil delivered. The functioning of the control valve is illustrated in the diagrammatic views.

With the valve in the position shown in view 1, the piston is at rest, since lines from ports *J* and *K* are open to each other through the valve chamber *L*, which is itself closed to all other ports. Connection is made between the volume control port *M* and the port *N* leading to the tank, so that no pressure is exerted on piston *G*. The variable-delivery pump, however, is supplying a small amount of oil through the ports *O* and *P* where it joins the low-pressure oil in chamber *Q* and passes through the low-pressure relief valve to exhaust.

For rapid traverse, the valve moves to position 2, so that the gear-pump oil enters the chamber *Q*, and passing through the bore of the valve to the right-hand end of the chamber *R*, and then through port *M*, operates piston *G* and causes pump *A* to increase its delivery. The oil enters through port *P*, which is open to ports *J* and *K*, and thereby connected with both ends of the piston, which moves forward at a rapid rate due to the differential construction, the area of the rod being equal to half that of the piston. The oil forced through the pipe to port *K* combines with the outgoing fluid and assists in producing the rapid movement.

The cutting feed is obtained when the valve reaches position 3, where the connection between *M* and *N* is again such that the supply from pump *A* to port *P* is small. The oil leaves the valve chamber at port *K* and enters the top end of the main cylinder. The piston *H*, traveling downward, forces oil to port *J* through the holes in the valve bore and along the chamber *Q*, where it combines with the oil from the gear pump and returns through the relief valve to the tank.

For the rapid traverse, the position shown at 4 is assumed. The gear pump supplies oil to port *S*, which passes through the chamber *Q* and the valve bore and enters chamber *R*, which is open to port *M*, thus increasing the supply from pump *A*. This oil enters at port *O* connected to *J*, and passing forward, returns the piston. The oil forced out of the cylinder returns by way of port *K* and valve holes to chamber *Q*, and again uniting with the gear pump oil returns to the tank.

The final neutral position 5 disposes of the fluid

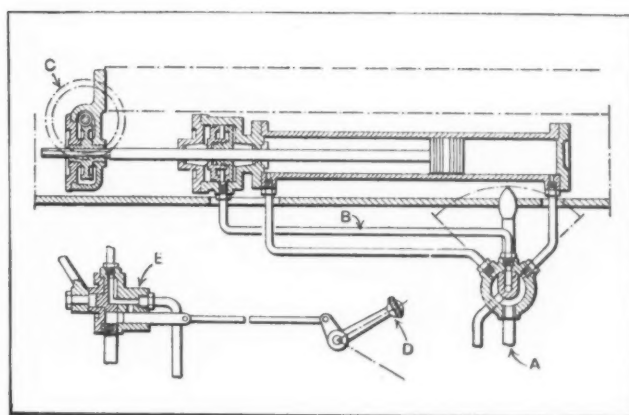


Fig. 11. Hydraulic Power and Hand Traverse Arrangements for Table of Jig-boring Machine

as in position 1, the opposite sides of the piston being connected through the chamber *L* and being free of pressure. The operating mechanism, which is shown at 6, comprises a trip-block *a*, arranged to slide in a casing and coupled to the valve rod. The block is normally held in the left-hand position by the spring *b*, but can be moved to the right by depressing the foot-pedal, which

causes the cam surface of lever *c* to engage the shoulders of the trip-block, forcing it and the valve as far as possible to the right. This is the initial valve position 1.

Release of the foot-pedal allows spring *b* to move the valve to the left until intercepted by the bottom plunger *d* of the latch *j* engaging the slot *e*. The valve is now in position 2, and as the head moves rapidly downward, the dog *f* is disengaged from the roller *g* and the spring *h* forces latch *j* downward until it engages the shoulders of plunger *d*, disengaging it from slot *e*, while the plate *k* is lowered to engage the first step at *l* as trip-block *a* is snapped to the left by spring *b*. This movement, however, is insufficient to alter the oil flow of the valve in position 2, the purpose of plunger *d* being to prevent the trip-block from moving to the left until the head moves downward sufficiently for plate *k* to engage the first step at *l*.

The rapid approach is changed to slow feed when the head moves downward sufficiently for the dog *m* to engage the roller *g*, thereby elevating latch *j* and disengaging plate *k* from the first step at *l*. The valve can then be moved to the left by spring pressure until the plate engages the second step at *l* and position 3 is reached.

This sequence is repeated for positions 4 and 5 by utilizing the third and fourth steps at *l*. Of the three dogs, *m* is the shortest, *q* of intermediate length, and *f* the longest. At any moment during the downward movement of the head, depression of the pedal will cause the cam face *r* to exert pressure, by the means shown, against the plate *s*, thus elevating latch *j* and plate *k* and allowing the valve to move to the position giving rapid return, or, if depression is continued, to the stop position.

The function of the upper plunger *t* is to snap into the slot *u* to insure that the valve position 4 for the rapid return is automatically obtained when latch *j* is lifted by depressing the foot-pedal in an emergency. Continued depression of the pedal, however, lifts plunger *t* clear of the slide and enables the valve to move to position 1 and bring the machine to rest.

Hydraulic Traversing Arrangement for Jig-Boring Machine

Hydraulic power has been utilized for the operation of clamping devices, mechanical clutches, and reverse motions. In Fig. 11 is shown the hydraulic power and hand traverse arrangements for a jig-boring machine table invented by the Société Genevoise d'Instruments de Physique, Geneva, Switzerland. In this system, oil is supplied through the pipe *A* to the valve chamber, which, with the lever as shown, admits oil to the pipe *B* leading to the space between the two pistons, forcing them apart and thus causing the conical members to grip the piston-rod and clamp it in position. Movement of the lever to the end positions indicated results in transferring the pressure to either end of the cylinder, actuating the table traverse after freeing the clamping device.

The hand traverse is operated by the handwheel *C* connected to a nut on the piston-rod end. In order to prevent either the hand or power table mechanism from being operated when the table is clamped by lever *D*, this is connected to a relief valve *E*, which is moved to the right when the table is locked, so that the valve is open to exhaust.

* * *

Head of Electrically Welded 4000-Ton Press Shows But Slight Deflection

A press of 4000-ton capacity for use in making corrugated plates was recently built at the plant of the A. B. Farquhar Co., Ltd., York, Pa., which showed a deflection of less than 0.006 inch on the head. This press is of entirely electric-welded construction, the welding being done by "Fleetwood 6" electrodes and Lincoln alternating-current welding machines. Alternating-current welding was proved well adapted for use on this work, a minimum amount of "arc blow" being noted while welding in the corners.

The base of the press was built of large structural column beams with seven heavy partition



Fig. 1. Base of Electrically Welded 4000-ton Press

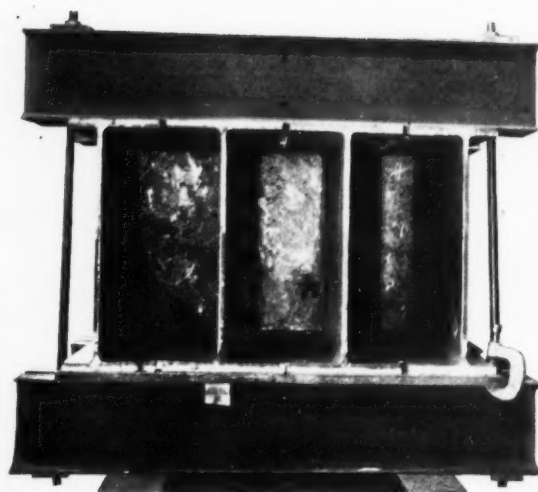


Fig. 2. Structural Members of Base Shown in Fig. 1 Assembled for Welding

plates between each of these columns, as shown in Figs. 1 and 2. The manner in which the parts of the base were assembled for welding is shown clearly in Fig. 2.

Economies obtained in the construction of this large press by welding were due largely to the elimination of patterns and rivets, the work consisting simply of cutting up the proper structural members, assembling them in their proper places, and fusing all of the component parts into one homogeneous unit.

* * *

We should all be very careful when we say "no" to a suggested improvement or plan made by a subordinate. A "no" in most cases is final. There is no appeal from it. On the other hand, if we say "yes," the matter usually comes up for review by other superior officers, which gives such suggestion the advantage of having several officers review it. We are usually more careful when we say "yes," because we know that our "yes" decisions will have to stand the test of performance or further approval. As a matter of fact, we should be more careful with our "noes," for the very reason that they do not have to stand the test of performance or further approval.—A. W. Robertson, Chairman of Board, Westinghouse Electric & Mfg. Co.

* * *

More than one hundred years ago, aluminum was discovered. Just a little over fifty years ago its cost was \$12 a pound. Then a young man discovered a new process for obtaining aluminum from its ores and the price was lowered to around 20 cents a pound within a few years. This discovery revolutionized the world's kitchens, made dirigibles possible, and influenced transportation in many different ways.

Care of Commutators to Save Repair Bills

By L. E. MILLER
Electrical Engineer
Reliance Electric & Engineering Co.
Cleveland, Ohio

NEARLY every maintenance engineer has his own pet ideas on the proper care of direct-current commutators. There is always an opportunity for honest differences of opinion on this subject. In putting forth the following suggestions, the writer, therefore, merely wishes to state that they are based on experience with many thousands of machines.

In practically all cases, the machine should be put into service in the condition in which it is received from the manufacturer. It has just been thoroughly tested, the brushes have been well bedded-in to fit the commutator contour, and the commutator itself has been finished to as high a degree of perfection as is possible without actual long-time running. It should, however, be carefully watched during the first six months of service, because it is during this time that it is being finally polished by the action of the brushes and is—and ought to be—assuming the glossy, chocolate-brown appearance which is an indication of long-wearing characteristics both for the commutator and the brushes. Unless burning or roughness is in evidence, the commutator should not be touched with any grinder or sandpaper.

If burning or roughness is in evidence, however, the trouble should be immediately investigated and remedied. Insufficient or excessive brush pressure; high mica insulation projecting above the commutator bars; overloading; whipping of the belt; uneven gears; vibration of the machine on which the motor is mounted; or an "unequally bedding" brush surface might be the cause.

In case of roughness, which may be in evidence on even the best manufactured commutator, because of the seasoning of the mica when running, or because of flashing due to excessive starting load, high dynamic braking or heavy overload current, fine sandpaper should be used to smooth the surface. Never use emery cloth, because emery dust is likely to become imbedded in the bars and cause them to act like a lapping block. If sandpaper will not remove the roughness, a commutator stone may be used. Should this also fail, the only remedy is to re-turn the commutator in a lathe. Care should be taken to see that no oil gets on the commutator surface, as the oil would be absorbed by the insulation and could not be removed except by rebuilding the commutator and replacing the oil-soaked mica.

If, owing to brush chattering or other causes, commutator lubrication appears to be necessary, a small amount of paraffin wax may be used during

the time that the commutator is seasoning. When a commutator is first manufactured, the surface is covered with innumerable microscopic ridges which cannot be removed except by the wear due to actual running over a long period. While the action of the paraffin on a commutator is not definitely understood, it would seem that the material fills in the minute valleys between the ridges and thus tends to prevent excessive wear of the brush. If paraffin is used, it should be applied very sparingly, by putting it on a piece of canvas in so small a quantity that it barely stiffens the fabric. After applying this canvas to the commutator surface, the latter should be immediately wiped off thoroughly with a clean piece of canvas.

Most modern commutators are under-cut—that is, the mica insulation between the copper bars is cut down slightly below the copper bar level in order to avoid the risk of the mica protruding high enough during the seasoning time to prevent the brushes from maintaining a good contact with the bars, and so causing sparking and wear. The writer prefers the V-type slot for the under-cutting. The cutter producing this slot is so made that it not only removes the upper side of the mica, but also a sufficient amount of the adjacent copper edges to form a small bevel on the edges of both sides of the slot. For the best results, a slot of this type may be cut shallower than the usual U-type slot.

The writer has no objection to the U type, except when the motor is operating in a dusty and dirty atmosphere, in which case the U-type slot often collects dirt and forms a short circuit between the bars. The V-slot, being wider and shallower at the opening, is less likely to collect dirt.

On some motors, however, it is not desirable to use a V-slot. This is especially true of very small motors, when the commutator is small in diameter. In that case, the wider slotting necessary for the V type produces what is practically a number of flat places on the commutator. These are likely to cause jumping and sparking of the brushes. For such cases, a U-slot is preferable.

In spite of the fact that many motors have been operated with insulation that is not slotted and is therefore flush with the commutator surface, such a practice appears inadvisable on general-purpose motors. After a motor has been manufactured, the seasoning and the protrusion of the mica continues for quite a time. If, therefore, flush mica is used, it is necessary to employ abrasive brushes from the start of operation.

EDITORIAL COMMENT

From time to time books are published on industrial subjects written by well meaning but misinformed social workers or reformers. Much misunderstanding of industry, its aims and methods, is thus passed on to the general public.

No one acquainted with the industrial history of the United States would deny that there have been abuses—grave abuses in industry. Such abuses can be found in every walk of life, in every field of activity; but only the thoughtless and superficial would judge all industry by isolated cases. One might as well condemn all government because there has been graft in governmental departments; all policing of our cities because there have been

policemen (and police commissioners) unfit for their office; and all hospitals because inexcusable mistakes have been

Combatting Misinformation—A Job for Industry

known to be committed in such institutions.

It has been the fashion to abuse industry. Government officials, newspapers, magazines, and book publishers have all had their part in telling the worst about industry—so much so that there are many people who have come to look upon industry as a menace to the national welfare. It is amazing how much easier false ideas take hold in the popular mind than accurate estimates.

After all, industrial activity is the backbone of civilized life. Industrial progress is the most important material factor in life as it is lived today. Practically the entire urban population of this and other great nations depends on industry for employment and livelihood. The products of industry supply the entire population with necessities that make life livable.

Industry, and the taxable wealth created by industry, furnishes by far the largest share of the taxes that support federal, state, and municipal governments. The enterprise, courage, and willingness to risk of industrial leaders have made our standards of living possible. Without industry, the only source of sustenance is the soil. How would we all like to return to the primitive method of wresting our food from the soil and getting our clothing and shelter in primitive agricultural pursuits?

It is time that industry asserted itself and gave emphasis to the part it plays in our national life. Men in high political position, to further their own

ends, have abused industry, while industrial leaders have gone about their business, building up the nation's resources. The time has come for industrial leaders to organize for concerted, unified action. What we need is a solidarity of the leaders

of business and industry—of the men who play so important a part in the creation of our modern civilization,

with its higher standards of living and opportunities for the "abundant life."

The forces that prey upon business and industry are organized. Industry as a whole—as a unit—is unorganized. Only through thorough organization and willingness to cooperate for common purposes can industry make its voice effective in the muddled thinking of the present day.

Why is it that there is today more unemployment in the United States than in the rest of the world? We have ample natural resources and an unequalled spirit of enterprise; men with capital and

ideas are willing to take risks. It would seem that here all the factors required for steady em-

Why Do We Have More Unemployment Here Than Abroad?

ployment are at hand; yet we have been unable to reduce unemployment as much as other countries.

The *International Labor Review* gives employment data for thirty-four different countries. From this it appears not only that unemployment in the United States is far more widespread than in the rest of the world, but that we have not succeeded as well as other countries in getting our people back to work. In the thirty-three countries outside of the United States for which statistics are given, there was by the middle of 1936 actually less unemployment than there was in the middle of 1930; whereas unemployment in the United States by the middle of 1936 was approximately three times as great as six years previously. Industry is working approximately at the same rate as in 1930—many industries at a higher rate. What is our real trouble? Have we by our measures of relief actually created an unemployed class?

Ingenious Mechanical Movements

Mechanisms Selected by Experienced Machine Designers
as Typical Examples Applicable in the Construction of
Automatic Machines and Other Devices

External Control for Mechanism within Rotating Member

By A. A. NEFF

The accompanying illustration shows a device that provides exterior control of the movements and adjustments of some movable element on a rotating shaft. By such a device, for example, the radial adjustment of the tool on the arm of a boring-bar can be made while the bar is in motion, the adjustment being made through controls that do not revolve with the bar and that can be operated as conveniently as when the bar is stationary; or the blade of a revolving screw propeller can be adjusted for pitch without regard for the motion of the propeller shaft.

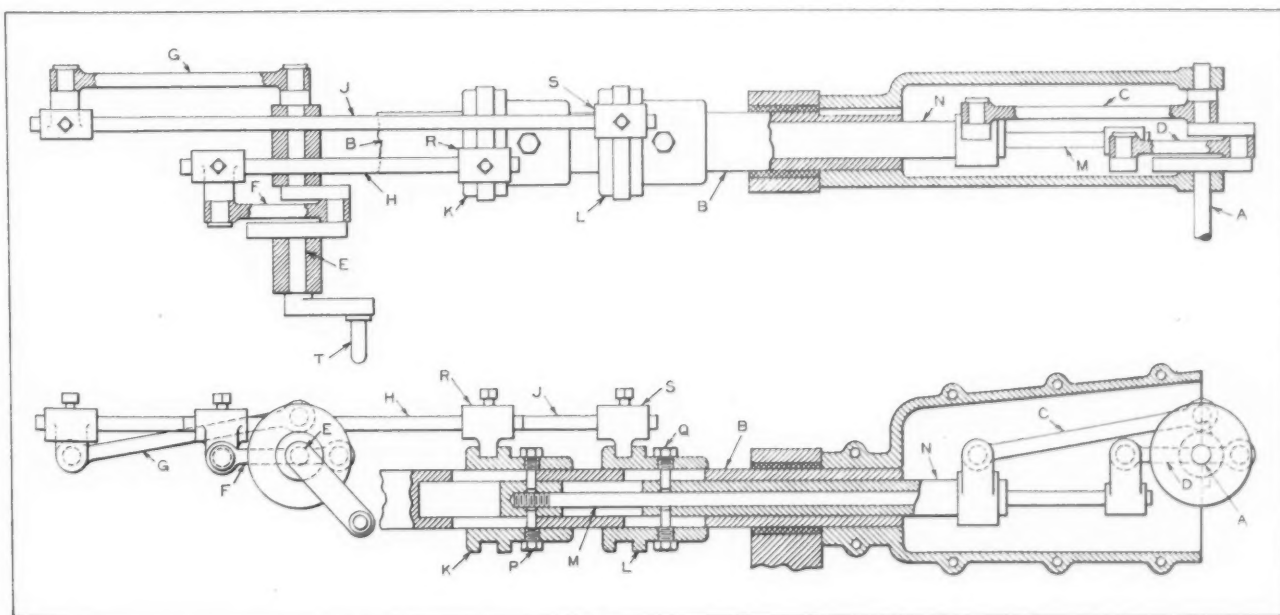
The illustration shows a more or less general arrangement of the device, many of its elements being subject to modification to adapt it to special needs and to the ideas of the designer. Also some construction refinements have been slighted for the sake of clarity, thus making the drawing somewhat diagrammatic.

The moving element to be adjusted is represented by the double crankshaft *A*, mounted in bearings that are carried on and rotate with the shaft *B*. The cranks are quartered, or set at 90 degrees to each other, and are driven by the con-

necting-rods *C* and *D*. Near the other end of the mechanism is another double-throw crankshaft *E* with quartered cranks having throws equal to those of crank *A*. It is to this crankshaft that the initial controlling movement is applied by hand-crank *T*.

Unlike shaft *A*, shaft *E* has no other motion than rotation about its own axis. Through the medium of the two connecting-rods *F* and *G*, this shaft imparts a reciprocating longitudinal motion to the rods *H* and *J*. This motion is transmitted to the sliding collars *K* and *L*, and thence to the central rod *M* and the sleeve *N*, which deliver the motion to the connecting-rods *C* and *D*. Any motion of the shaft *E* is thus duplicated in shaft *A*.

The two collars *K* and *L* rotate with shaft *B*, but are free to slide longitudinally on it. By means of pins *P* and *Q*, passing through slots in shaft *B*, the sliding motion of the collars is imparted to rod *M* and sleeve *N*. The reciprocating motions of rods *H* and *J* are transferred to the collars by means of the shoes *R* and *S* which ride in the grooves of *K* and *L*. It is thus seen that the motion of shaft *E* is transmitted to and translated on shaft *A* by longitudinal reciprocating motion at the points *R* and *S*, where the external stationary control parts meet the internal revolving control parts. This transmission of motion is thus independent of the rotative position of shaft *B*, and hence is entirely independent of its rotation.



Crank-operated Control for Mechanism within Rotating Member

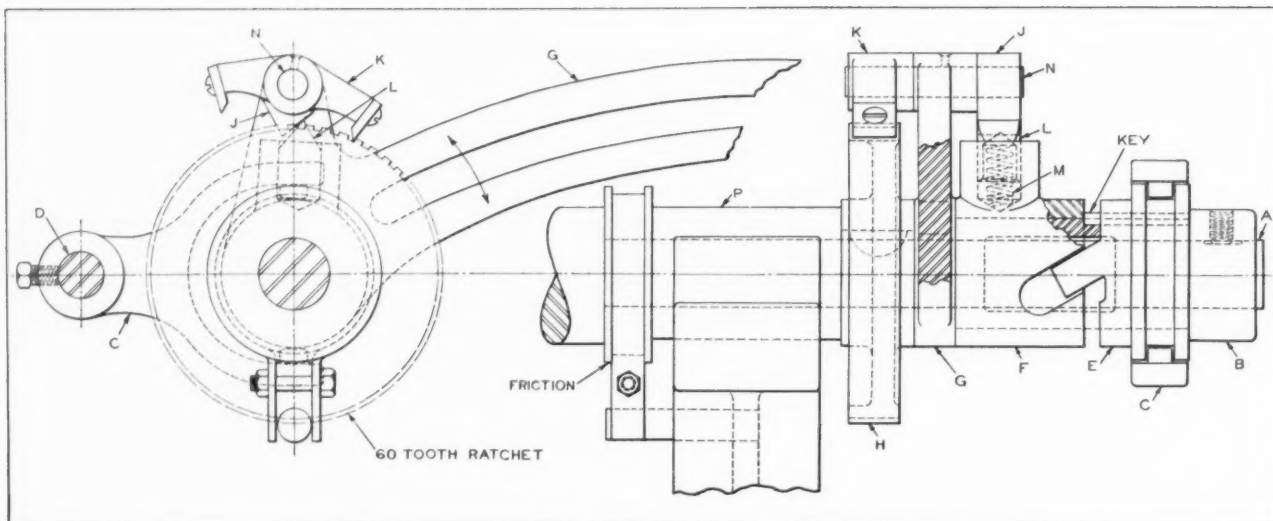


Fig. 1. Feed-screw Reversing Mechanism Used on Machines Shown in Figs. 2 and 3

Mechanism for Reversing Cross-Head Feed-Screw at Any Predetermined Point

By CHARLES H. HAGGERTY

The purpose of the mechanism shown in Fig. 1 is to reverse the direction of rotation of a cross-head feed-screw when the cross-head has reached any predetermined point in its traverse. Adjustment of the cross-head speed is accomplished by a slotted pawl-arm. Reversal of the feed is obtained by a double-pointed pawl which can be positioned to revolve the ratchet wheel forward or backward. Fig. 2 shows the mechanism applied to a machine for evenly distributing wire or cord on a reel or spool 50 inches in diameter, while Fig. 3 shows a similar application for a 30-inch spool.

The feeding and reversing mechanism consists of a single-threaded screw A, Fig. 1, supported in frame bearings P; pawl-arm G, which is free to rotate on screw A between ratchet H and collar B; the pawl-reversing cam F, placed over the hub of pawl-arm G; grooved sleeve E having a finger that

engages a slot in the pawl-reversing cam F; fork C, secured to guide rod D for sliding sleeve E to the right or left when cross-head S, Fig. 2, moves guide rod D through contact with collar R, Fig. 2.

The collars R are set to reverse the direction of rotation in accordance with the length of traversing movement desired. The sliding movement of sleeve E, Fig. 1, tips or rotates the reversing cam F

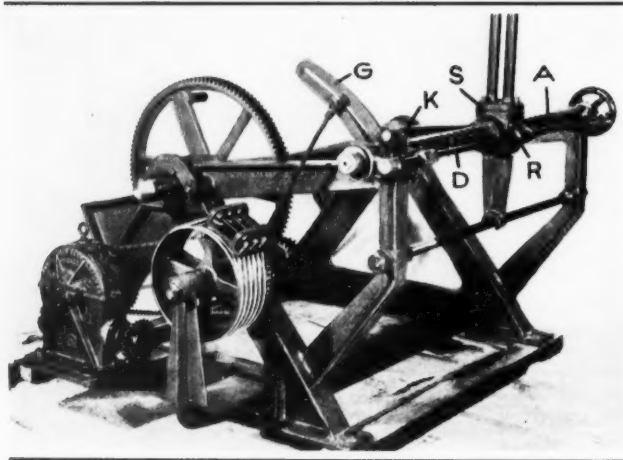


Fig. 2. Machine for Evenly Distributing Wire or Cord on Spool 50 Inches in Diameter

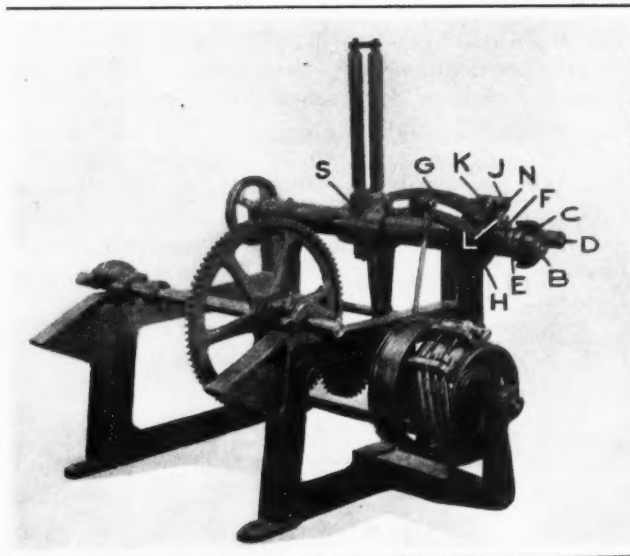


Fig. 3. Mechanism Similar to One Shown in Fig. 2, but for 30-inch Spool

which, in turn, depresses plunger L until it has passed the point of lug J. Spring M then forces plunger L outward against the side of lug J secured to shaft N. Shaft N, mounted in the short arm of pawl-arm G, is thus rotated, causing the pawl K to engage the ratchet on the other side of the arm, so that the lead-screw is revolved in the opposite direction. Pawl-arm G is oscillated by an eccentric on the drive-shaft. Should lead-screw A tend to back up, a simple friction brake can be applied.

Mechanism for Feeding Wooden Pegs into Magazine, Large Ends Foremost

By GEROULD R. McWANE

The purpose of the device shown in the accompanying illustration is to feed round wooden pegs *A* into the magazine *B* with their large ends downward to facilitate assembling them in the product. The wooden pegs are 1 1/4 inches long and 1/4 inch in diameter for a length of 1 inch, and 3/16 inch in diameter for a length of 1/4 inch. These pegs are fed along a chute *C* into the selector cavity *D*, as shown in the plan view. A constant pressure is maintained against the line of pegs in chute *C*, so that when the first peg in the line is removed another moves forward to replace it.

The plate *E* is moved backward and forward, as indicated by the arrows at *F*, being actuated by means of a cam and return spring, not shown. Plate *E* carries a block *G* and has a rectangular slot or hole *H* cut through it which opens into the chute leading to the magazine *B*. Block *G* pushes the first peg in line to the opposite side of the cavity, and at the same time, temporarily prevents any other pegs from entering the cavity. The rectangular slot serves to open and close the opening in the floor of the cavity above the magazine chute. It will be noted that the slot in the slide is slightly wider than the 1/4-inch diameter of the wooden peg and also that it is shorter than the peg, being about 1 1/16 inches long.

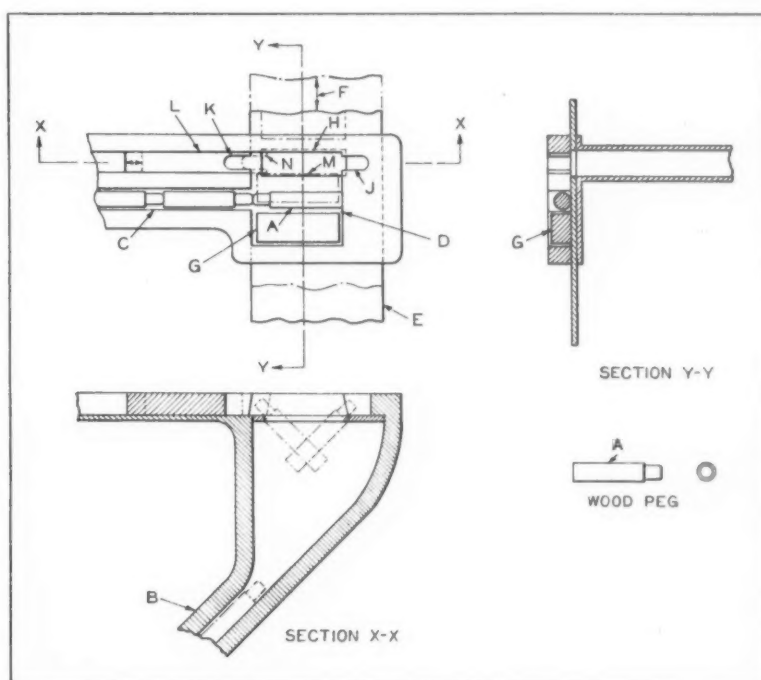
In the right-hand wall of the selector cavity *D* is a notch *J*, as may be seen in the plan view. This notch is slightly wider than the 3/16-inch diameter of the peg but not as wide as the 1/4-inch diameter and is somewhat deeper than the 1/4-inch shoulder on the small end of the peg. Opposite this notch and on the same center line is a similar notch *K*, cut in the end of a movable block *L*, which is made to extend into and be withdrawn from the cavity of the selector by means of a suitable cam and return spring, not shown. The motion of this block is timed relative to that of the plate *E* in such a manner as to produce the operating cycle to be described.

Let it be assumed that all of the parts of the selector are in the position indicated by heavy lines in the illustration, and that the first peg has entered the cavity with its small end pointing backward along the chute *C*. The block *L* is next withdrawn and the slot *H* opens the floor of the cavity into the upper part of the chute leading to the magazine. Now the plate *E* moves forward, carrying the block *G* to the position indicated by the dot-and-dash lines at *M*. This pushes the first peg across and in line with the two notches *J* and *K*,

and at the same time, cuts off the surplus flow of pegs into the cavity.

Next the block *L* moves to the right a distance of 3/16 inch, as indicated by the dot-and-dash lines at *N*, and the notch *K* engages the small end of the peg. The plate *E* then moves back to its original position, the peg being prevented from following the block by the confining notch. As soon as the slot *H* returns to its position above the magazine chute *B*, the peg, being unsupported at all points except under the small end, drops downward, the large end falling into the chute first so that the peg slides into the magazine with the 1/4-inch end to the left. The block *L* then returns to the original position.

The second peg, which enters the cavity small



Mechanism for Feeding Pegs *A* from Chute *C* to Magazine *B* with Large Ends Foremost

end first, will be considered next. The block *G* also pushes this peg across to the position between the notches, but when block *L* moves into the cavity this time, as the notch *K* is too small to engage the 1/4-inch diameter, the peg is pushed to the right, causing the small end to enter the notch *J*. When the slot *H* returns, it again leaves the peg unsupported at all points except under the small end, so that the large end falls downward and the peg slides along the chute into the magazine with its large end to the left.

This cycle of cam-actuated movements of slides *E* and *L* continuously feeds the pegs into the magazine *B* with their large ends downward. The magazine on which this selector is used has a capacity for handling about fifty units per minute. At this speed, the feeding device functions perfectly, and there appears to be no reason why it could not be operated at a much higher speed.

Engineering News Flashes

The World Over

World's Largest Flat Wire Rope

The largest and strongest flat wire rope ever made is said to be that recently completed at the Trenton, N. J., Works of the American Steel & Wire Co., which will be used for operating the emergency gates at the Fort Peck Dam on the Missouri River in Montana. This flat wire rope is 1 inch thick by 9 inches wide. Tests indicate that it has a breaking strength of 785,000 pounds.

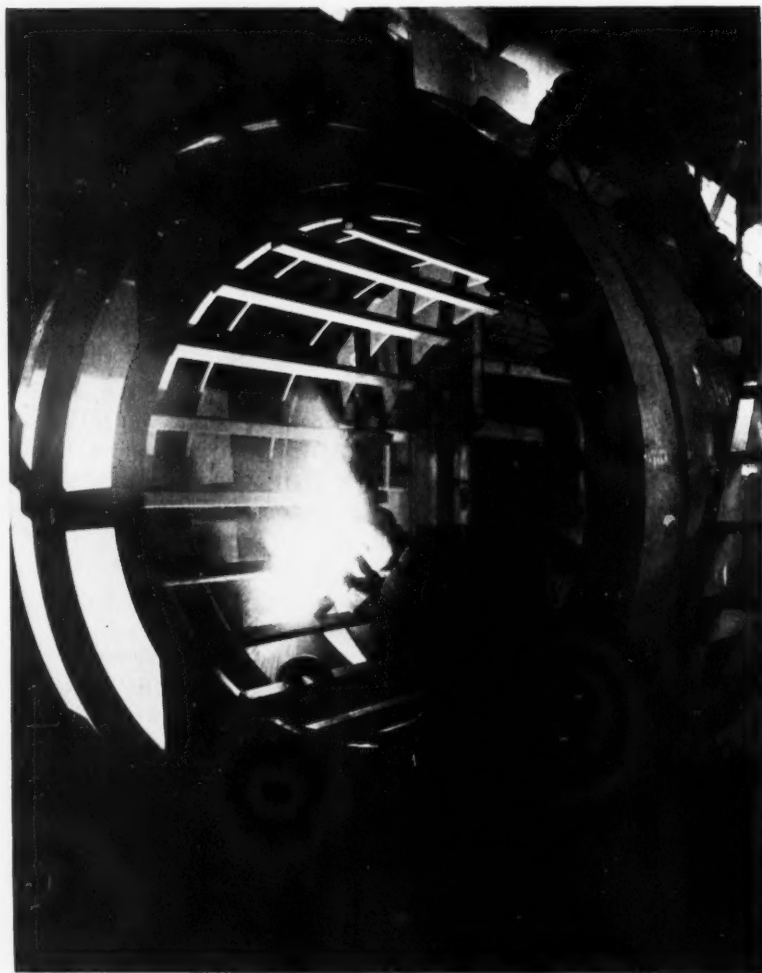
Electric Lighting Equipment on Bicycles

A small generator for the headlights of ordinary bicycles is now being made by the Dyno Works, Ltd., Newcastle-upon-Tyne, England. The generator equipment, which weighs less than a pound,

is attached to the rear wheel, from which it derives motive power as the bicycle is pedaled. A rear lamp is fitted into the generator unit, while an insulated wire carries current to the headlight. The outfit is claimed to be serviceable for from three to four years without attention.

Plastic Molding of Large Size

An unusually large plastic molding job has recently been placed in production by the General Electric Co. This molded product is a Textolite housing for a Western Union "Teleprinter." This protective and decorative case is made in the form of a hood 15 inches long, 14 1/4 inches wide, and 10 1/4 inches high. It weighs slightly less than 7 pounds. The mold used to produce the housing weighs about 5 tons.



New Heat-Treatment Makes Better Rails

A new process which marks one of the greatest forward strides in rail manufacture has been placed in commercial operation at the Gary, Ind., Works of the Carnegie-Illinois Steel Corporation. This new process, which is known as "Brunorizing," embodies two definite steps—heat-treatment and end-hardening of rails. In applying this method, the rails, after their final rolling pass through the mill, are allowed to cool to a predetermined temperature on the hot-beds, and are then heat-treated in a continuous furnace of special design, under careful pyrometric control. In emerging from the furnace,

A Gas-tight Generator Frame Section for a 58,000-kilowatt-ampere Hydrogen-cooled Turbo-generator, Entirely Fabricated by Arc Welding in the East Pittsburgh Shops of the Westinghouse Electric & Mfg. Co. The Welds are Tested at a Pressure of 80 Pounds per Square Inch

An Arc-welded Exhaust Hood for a 25,000-kilowatt Steam Turbine Being Machined on a Large Boring Mill in the Schenectady Shops of the General Electric Co.

the ends of the rails are hardened by a newly developed method involving quenching by the aid of compressed air. The process is largely the result of the work of the late John Brunner, former consulting engineer of the company, and Arthur D. Beers, chief chemist and metallurgist of the Gary Steel Works. "Brunorizing" greatly increases the life and safety of rails.

Ninety-Nine Per Cent Fireproof Ship

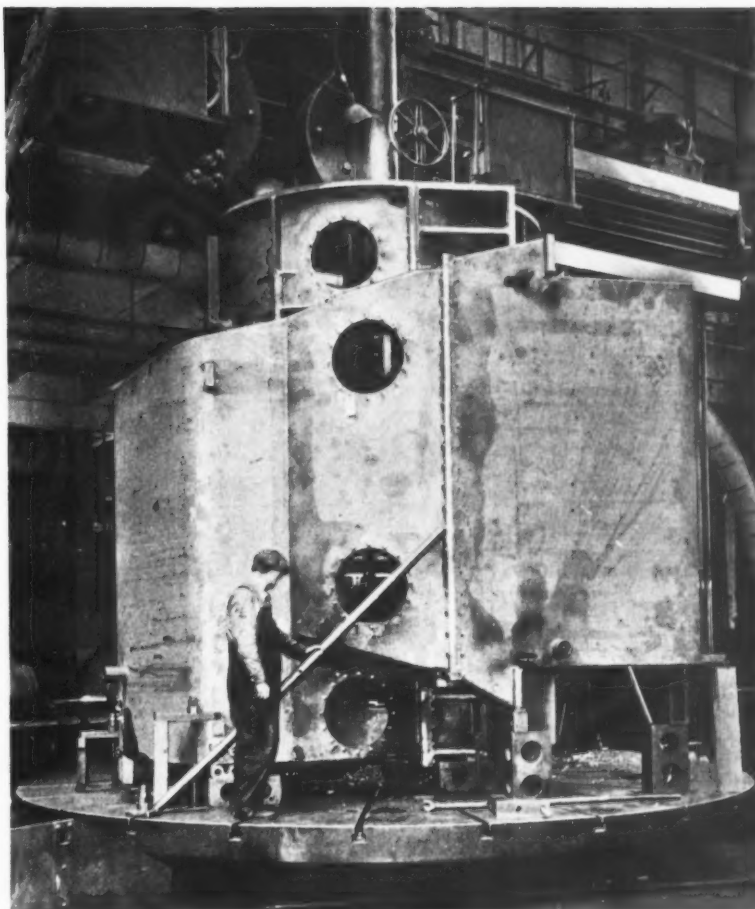
The S.S. *Catherine*, which plies in the West Indies inter-island trade, is said to be the first combined passenger and cargo ship that is practically fireproof throughout. In fact, it is said to be a 99 per cent fireproof vessel. The size of the ship is about 4000 tons, with an overall length of about 260 feet. In its construction, liberal use has been made of fireproof products. The remarkable thing is that the fireproof sheathing, floor, wall, and ceiling materials now available are so attractive in appearance that the passenger accommodations of the ship compare favorably with those of the luxury trans-atlantic liners. Among the materials used are Marinite and Marine Sheathing, both products of the Johns-Manville research laboratories.

New Types of Metal Finishes

The checked surface of old wood or china can be imitated, according to Gustave Klinkenstein, vice-president of Maas & Waldstein Co., by spraying the surface with a coat of colored lacquer enamel followed by a coat of "Checklac," a lacquer that cracks open on drying. Another type of lacquer known as "Prismlac" becomes ornamented with crystals in drying, these crystals growing larger and covering the entire surface. Unusual finishes can be obtained with this lacquer used either clear on polished metal surfaces or in combination with colors or bronze powders.

Protecting Lapped Edges to be Welded

The problem of rusting or corrosion of lapped edges that are to be welded, a difficulty especially met with when partially fabricated parts have to



be shipped or stored, is being overcome by a new black primer developed by the Sherwin-Williams Co. The new product is known as "air-drying spot-welding black primer." It has been developed primarily for automotive requirements. It overcomes the difficulty met with when spot-welding surfaces that have been given coats of ordinary paint, enamel, lacquer, or varnish. Such films tend to insulate the metal surfaces, with the result that when sufficient current is used to weld the painted spots, so much heat is created that the metal surrounding the painted areas burns and a poor weld is produced. The new primer permits instantaneous spot-welding with low voltage and low pressure, and eliminates the burning away of the paint surrounding the spot-weld. It also prevents rust forming between the laps, at the places where moisture accumulates.

Japan Establishes Research Institute

A large appropriation has been approved by the Japanese Government for establishing a Precision Machine Research Institute at the Tokyo University of Engineering. This research institute will be manned by about one hundred engineers and scientists, according to a report from assistant trade commissioner Carl H. Boehringer of Tokyo, as published by the Bureau of Foreign and Domestic Commerce.



Fig. 1. Hand-operated Bench Bender Used in Forming Steel-rule Stock for Dies



Fig. 2. Printing Press Equipped with Steel-rule Die for Cutting Washers

Steel-Rule Piercing and Cutting Dies

Methods Employed in Making and Using So-Called "Steel-Rule Dies" for Producing Both Large and Small Gaskets, Filler Pieces, Separators, Special Washers, etc.

By C. L. SZALANCZY, Tools and Equipment Department
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

THE materials usually cut by so-called "steel-rule dies" are paper, cardboard, fish paper, vellamoid, felt, cork, asbestos, leather, rubber, thin aluminum, copper, and tin. The thickness of these materials ranges from 0.003 to 3/16 inch. The steel-rule die material is made with two different types of cutting edges, both of which are shown in Fig. 3. The type illustrated at *A* has the cutting edge at one side of the face, while the type shown at *B* has the cutting edge at the center of the face. The latter type has been found to be better adapted for most work of the kind considered in this article.

The steel-rule die material comes from the manufacturer in strips 36 inches long, 15/16 inch high, and 0.028 inch thick. This material is tempered and sharpened ready for use. It is produced in four different grades of hardness, the two softer grades being used when forming blank shapes with very small corner curves and holes about 1/8 inch in diameter.

When dies are made from either of the two softer grades, the steel must be hardened after be-

ing formed by the toolmaker. However, the two harder grades are used for the work described, thus eliminating the hardening operation. When tested for hardness, this rule material shows a scleroscope reading of about 45, which is hard enough to maintain a keen edge when used to cut soft materials. At the same time, this hardness leaves the material sufficiently pliable to allow it to be bent or formed to a radius of about 1/8 inch without fracturing.

Special tools are used by the toolmaker in constructing steel-rule dies. The first tool is a rigidly built jig saw with a special attachment for drilling holes. Then there are two separate bench tools operated by hand-levers. The first is a small shear which cuts off the strap material to the required lengths, while the second tool is used for forming purposes.

The bending tool, Fig. 1, has a set of forming jaws which can be quickly inserted and permanently held in the tool by a dovetail arrangement. By the aid of these jaws, all kinds of bending and forming operations can be performed. A V-punch

and a round pin are used for bending circular shapes. When the rule stock must be formed for cutting or punching small holes, it is best to bend the two ends of the material to a radius somewhat smaller than the radius of the hole to be punched. After the material has been formed into a punch of approximately tubular shape, the ends can be rounded out to size.

In bending circular forms and angles, it has been found best to keep working the steel-rule material with a steady but rather easy pressure instead of trying to bend it to shape in one stroke. If the material is formed in this manner, there is very little danger of breakage.

The steel rule is inserted and held in a frame or shoe made of five-ply laminated maple wood, which comes in sheets 24 inches by 36 inches by 5/8 inch thick. These sheets can be cut to any length, width, or shape required. In constructing a die, the tool-maker lays out the shape of the piece to be made on a block of the plywood. This lay-out must be made very carefully, and when it is completed, the scribed lines should be gone over with a pencil to make them clearer and easier to follow when sawing. Holes 3/16 inch in diameter should be drilled on the lines to allow the jig-saw blade to be inserted. The saw cuts may be made in both directions from the drilled holes.

Two frames or shoes are shown in Figs. 4 and 5. The die arrangement shown in Fig. 4 is for cutting out a rectangular part, while that shown in Fig. 5 is for a washer, with the lines scribed and the 3/16-inch holes *C* drilled ready for the sawing operation. In using the type *B* steel rule shown in Fig. 3, the sawing should be done on the center of the line on the lay-out; but when the type *A* rule is used, care should be taken to saw either to the left or right of the line, in order to bring the cutting edge of the rule directly on the center of the scribed line.

The pieces or plugs, such as shown at *G*, Figs. 4, 5, 7, and 8, that are sawed out of the plywood must be saved for use in the die assembly. The jig-saw blade is of the same thickness as the rule material. For example, in assembling the die shown in Fig. 7, the formed cutting steel *F* is placed in the outer frame *H* and the cut-out plug *G* is forced or hammered back into position so that it is flush at the bottom. All corner joints must be neatly made and filed to fit, as shown at *J*, Fig. 7.

When a die like the one shown in Fig. 5 is being made for a round piece of work, an allowance of 0.010 inch is added to the calculated diameter of the blank. The end of the steel rule on one side is cut back 1/32 inch, forming an angle *K*, as shown in Fig. 6. If this were not done, the two ends could not be brought together to form a tight joint.

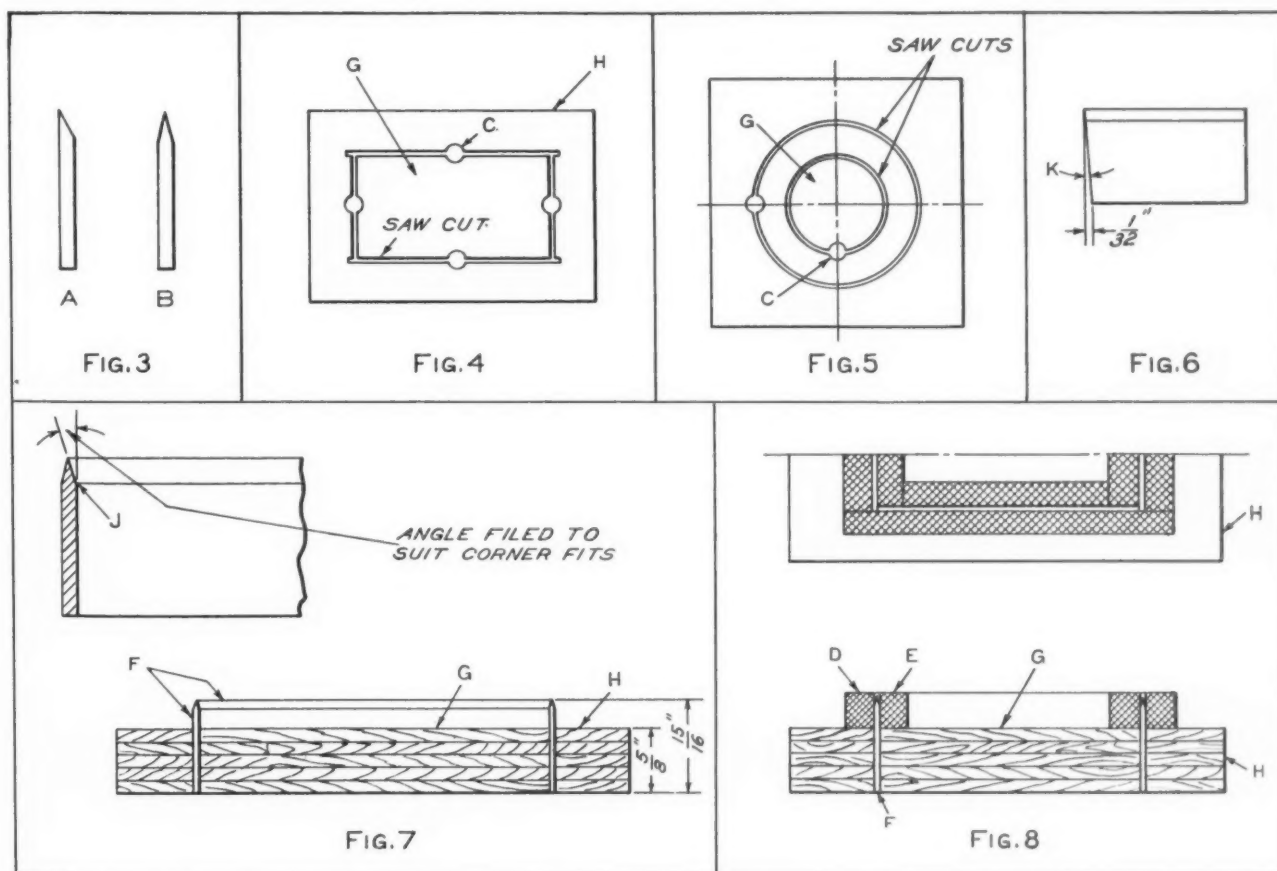


Fig. 3. Two Types of Steel-rule Cutting Edges. Fig. 4. Rectangular Blank Frame with Holes *C* Drilled to Permit Taking Saw Cuts for Cutting Blades. Fig. 5. Frame for Washer-cutting Die. Fig. 6. End of Steel Rule Cut at Angle *K* to Give Close Fit when Ends are Joined. Fig. 7. Method of Joining Corners and Assembling Steel-rule Die. Fig. 8. Rectangular Die with Stripping Rubber *D* and *E* in Place

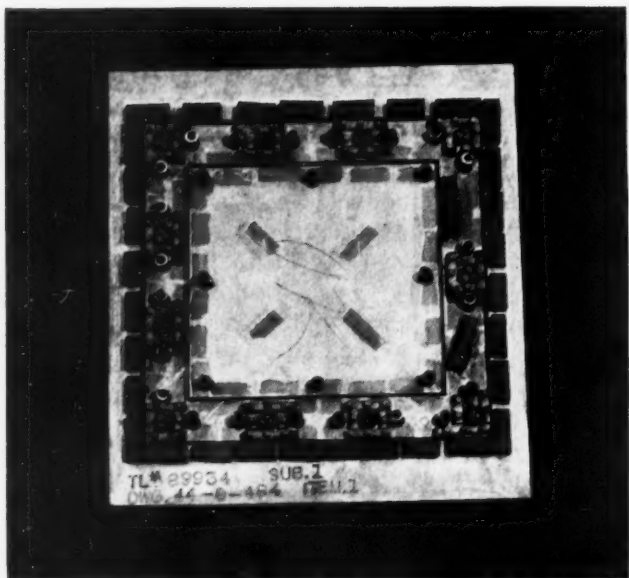


Fig. 9. Steel-rule Die Provided with Steel Coil Springs for Stripping Blanks

Strips of sponge rubber *D* and *E*, Fig. 8, are glued on both sides of the rule *F* for the purpose of stripping or removing the work from the steel-rule die after the cutting operation has been performed. When there is no cutting pressure on the die, the sponge rubber should be extended slightly beyond the cutting edge of the rule to insure stripping. Sometimes strips of cork may be employed for stripping the work from the die. In one case it was found necessary to use a number of small steel springs, 1/2 inch in diameter, as shown in Fig. 9, to obtain the required stripping action.

The die is set up in a printer's frame and blocked by means of wood strips. The frame is placed in a printing press from which the inking rolls have been removed and which has a piece of fiber 1/8 inch thick fastened on the moving table. The die cuts against this fiber. When thin metal is being cut, it may be well to use a sheet of half-hard brass instead of the fiber. Three small pieces of cork are glued on the fiber or brass to locate and support the material being cut. In case the material should happen to stick to the die, as it often does, four small pieces of plywood may be glued to the side frames. These pieces of wood will act as a stop for the printing press table and also regulate or determine the cutting depth of the die.

When the stops are slightly higher than required and the die does not cut clear through the blank material, a quick adjustment can be made by slipping a sheet of cardboard of the correct thickness behind the fiber on the press

table. This will usually correct the faulty cut, and the stripped material will be pushed back into its former position in the original piece and remain on the press table.

A rheostat controls the speed of the printing press. Up to 900 blanks can be produced per hour with a single-impression die. If production requirements are such that one die cannot produce enough blanks to take care of the demands, several of these dies may be made and assembled into a gang die to increase the production. The safety apron shown in Fig. 2 is necessary to safeguard the machine operator. This device automatically brushes the operator's hands up and out of the press, thus reducing the chances of injury.

It may be of interest to compare the cost of these tools with that of tools built in the regular manner and mounted in standard commercial die sets. In Fig. 10 is shown a cork gasket which is 4 inches square, 1/8 inch thick, and has its four corners trimmed off at an angle of 45 degrees. The blank contains eight 1/4-inch holes and one 1 1/2-inch hole. About 4 1/2 hours would be required to build a steel-rule die for the production of this gasket, as compared with 49 hours for the production of a regular die.

Fig. 11 shows a vellamoid gasket, 1/16 inch thick and 3 1/4 inches across. Three 1/4-inch and one 2 1/8-inch holes are pierced in this gasket, which

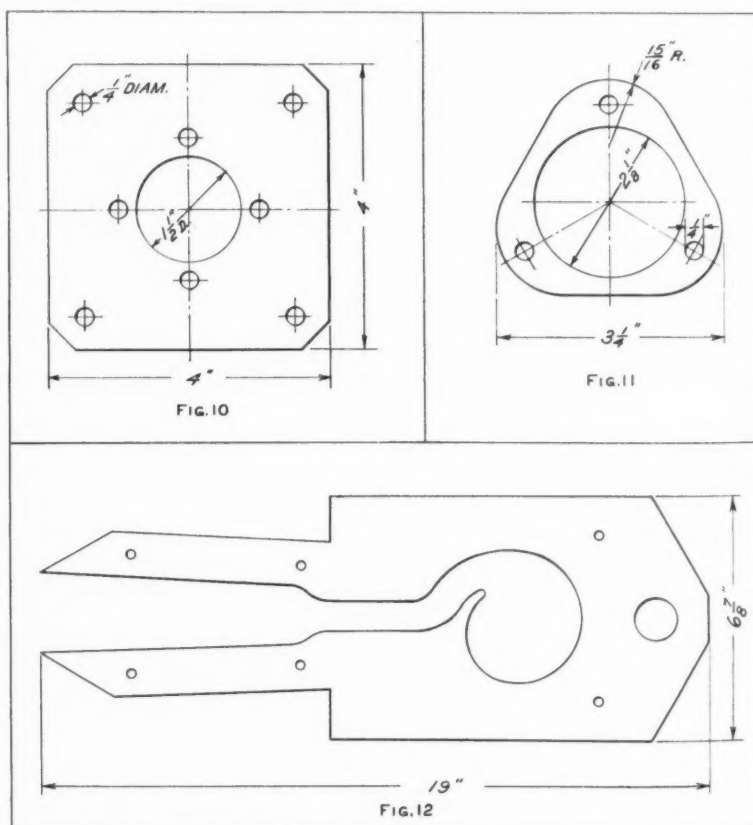


Fig. 10. Cork Gasket Blanked and Pierced with Steel-rule Die. Fig. 11. Typical Vellamoid Gasket Produced by Steel-rule Die. Fig. 12. Blank Cut from Fish Paper with Steel-rule Die

is rounded on the three corners. The die for this work will take longer to build, because of the curved outer contour. The estimated building time for this steel-rule die is 5.6 hours, as compared with 63 hours for a die of the regular type.

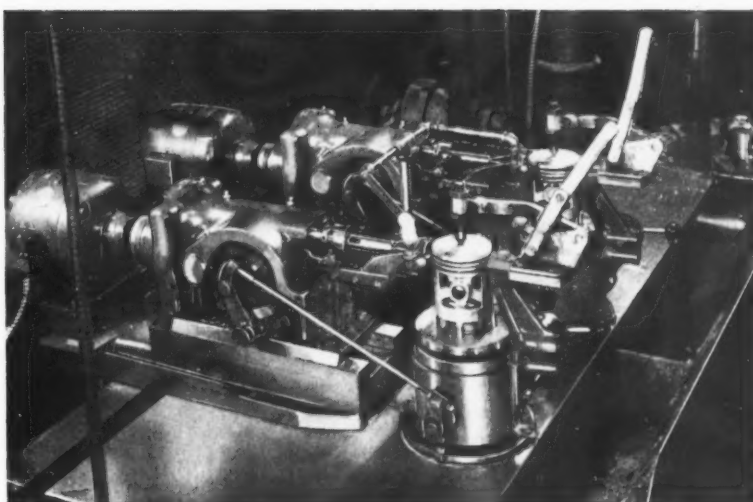
Fig. 12 shows a large fish-paper blank, 1/32 inch thick, 6 7/8 inches wide, and 19 inches long. It has six 1/4-inch holes and one 1 1/4-inch hole pierced in it. The center of the blank is trimmed out as shown. The time required to build a steel-rule die for cutting out this blank is estimated to be 13.5 hours. To build a regular stock die for the production of this blank would require 225 hours. This time includes about 20 hours for designing the tool. The time spent in designing really represents a saving, however, since it has been definitely established that, without proper tool drawings, it takes the toolmaker longer to build a die, because, in such cases, he must do the planning and designing during the building period.

From these figures it may be readily seen that, on small blanks, the savings in building time amount to about 90 per cent. On the larger blanks, the savings are much greater. Then the material savings may also be considered. In the case of the blank shown in Fig. 10, the material in the steel-rule die amounts to \$1, while the material in the regular die, including a standard die set with guide pins and bushings, would amount to at least \$35.

A further saving may be shown when a time study is taken and the piece cost compared, as produced by the printing press and the punch press. The life of the steel-rule dies is practically indefinite. Some dies have been in active service for two years, and after having produced over 100,000 blanks, are still in good condition. Of course, these dies must be touched up on the cutting edges with a Carborundum stone from time to time.

* * *

"Save the babbitt bearings," was the management's warning to the welders working on the repair of a rock crusher. Just above the bearings the cast-iron hopper was broken in two places—in the middle and across the end. These breaks were about 14 inches long each, and varied from 2 to 3 1/2 inches in thickness. The cracks were chipped out, the bearings packed around with wet asbestos, and the casting preheated with a kerosene torch to a black heat. The welder started and finished the bronze-welding while his helper, using an extra blowpipe, assisted with local preheating in the vicinity of the welding and also kept water flowing on the asbestos-covered bearings. The job was successful and the bearings unharmed.—*Oxy-Acetylene Tips*



A Smoke Hole is Drilled in Packard Pistons Every Three Seconds by Each of These Machines

Rapid Method of Drilling Smoke Holes in Pistons

Smoke holes are drilled around pistons in the plant of the Packard Motor Co., Detroit, Mich., by means of small self-contained machines that give a high production, although drilling only one hole at a time. Two of these machines are shown in the accompanying illustration. Each piston is centered on a fixture from the finished inside of the skirt and also from a center hole in the closed end.

During the drilling, the back of the piston is supported near the closed end by a hardened and ground block on the arm to which the centering device is attached. The drill is guided by a device that is provided with two fingers which enter one of the ring grooves in the piston each time that the drill spindle is advanced for an operation. The drill spindle is reciprocated by means of a cam. Indexing of the fixture is synchronized with the reciprocating movements of the spindle.

Twelve holes are drilled around each piston. The production rate is 120 pistons an hour per machine, and one operator tends both machines, thus obtaining a production of 240 pistons an hour per operator. The time required for the forward and return movements of the drill in producing a hole is less than three seconds. These machines were built by the Kingsbury Machine Tool Corporation, Keene, N. H.

* * *

The new carbide cutting tools have greatly aided machine tool sales. The use of carbide tools in old machine tools is generally neither successful nor profitable. To get results with these tools, modern machine tools are required; and for that reason, many firms have found it advantageous to buy new machines in order to take full advantage of the new cutting tools.

Questions and Answers

Negatives of Machinery Photographs

A. S. M.—A commercial photographer whom I employed to make photographs of new machinery refuses to deliver the negatives to me, although I paid him fully for the photographs that he made. Is he entitled to keep these negatives? Can the photographer use these negatives to make extra prints?

Answered by Leo T. Parker, Attorney-at-Law
Cincinnati, Ohio

When a person engages a photographer to make pictures, the transaction assumes the form of an implied contract that the photographer will not violate the confidence of the patron and make extra copies of the picture and distribute the same. (59 F. 324) In a leading case (135 Pa. 970), a higher Court held that "unless an agreement exists between a photographer and a patron by which the latter has ownership of the negative, the photographer may keep it, but he has no right to make extra copies of photographs from it." In the same case, the Court held that if a photographer, without obtaining the consent of his patron, makes an extra copy and sells or gives it to another, the patron is entitled to recover damages thus incurred.

Strength of Leather Belting Not Determined by Thickness

G. O.—Is the strength of leather belting exactly proportional to its thickness?

Answered by W. F. Schaphorst, Newark, N. J.

Simply because a leather belt is thinner in one spot than in another is not conclusive proof that the strength varies throughout its entire length. The strength depends almost entirely on the place it occupied in the animal's hide. The tanning operation is important because it affects the strength, toughness, and life of the belt.

Tests on strips of belt 1 inch wide taken from various parts of a steer's hide show plainly that, in general, the thicker the hide, the weaker the belt per square inch of sectional area. The thinnest specimen from the back section of the hide is the strongest per square inch, while the hide from the neck portion has the lowest unit strength. Thus it is not absolutely necessary to make a belt of uniform thickness except to make it run more smooth-

A Department in which the Readers of MACHINERY are Given an Opportunity to Exchange Information on Questions Pertaining to the Machine Industries

ly, look better, or to make it mechanically correct. A belt may vary in thickness from end to end and yet have the same strength at any given section.

Of course, when the leather is taken from the choice part of the hide, as it should be, the cross-sectional strength is practically constant and the belt would really be benefited by shaving down to uniform thickness. The factors mentioned explain why, in making up high-grade double leather belts, it is possible to so match the overlapping plies that thin sections adjoin thick sections, thus producing a belt of uniform thickness and uniform strength.

Material for Pump Parts

O. G.—In designing a helical gear type rotary pump intended for handling fuel oil in marine service, what would be the most suitable materials for housing and gears? The contact between the two impellers will be a sliding contact.

Answered by the Editor of "Nickel Cast Iron News"

Nickel cast iron should be very satisfactory for use both in the impellers and in the housing for this rotary pump. For the impellers, we would recommend 1.75 to 2.00 per cent nickel cast iron, and for the housing, a 1.25 to 1.50 per cent nickel cast iron. The cast-iron composition would have to be suited to the sections of the metal required. The thermal coefficient of expansion is important in an application of this kind; and where both cast-iron impellers and cast-iron housings are employed, the coefficient would be the same, thus eliminating variable clearances, which would exist if different materials were used.

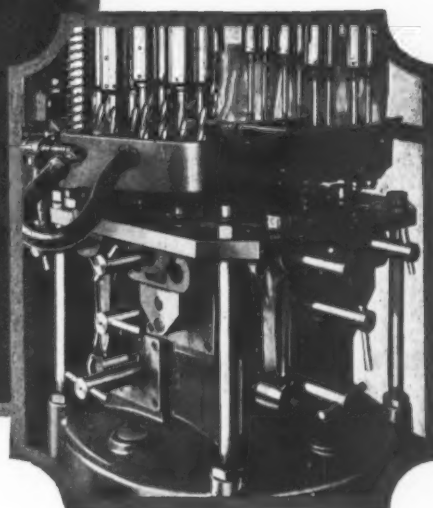
* * *

Stainless Steel Billboards

A 40-foot billboard, recently erected at the Chicago plant of Joseph T. Ryerson & Son, Inc., employs what is believed to be the first use of stainless steel for outside billboards. The gleaming silver of stainless steel affords excellent opportunity for unusual and brilliant color contrasts. The billboard is made from 24-gage Allegheny stainless steel of 18 per cent chromium, 8 per cent nickel content, chosen because of its high rust resistance and good fabricating qualities.



Design of Tools and Fixtures



Dies for Blanking and Drawing Conical Shell from Cold-Rolled Steel

By JOHN J. McHENRY, Detroit, Mich.

The dies for each consecutive operation in the production of a conical shell from cold-rolled steel stock 0.040 inch thick are shown in Figs. 2 to 7. The operations performed by the six dies illustrated consist of blanking and drawing; first, second, and third redrawing; trimming and piercing; and finish-drawing. The cross-section views in Fig. 1 show the work done by each of the six dies, beginning with the blanking and drawing operation performed by the die shown in Fig. 2, and ending with the finish-drawing operation performed on the die shown in Fig. 7.

The blanking and drawing die shown in Fig. 2 is of the conventional type, except for the provision made for removing the blanked and formed shell. In this die, the shell is ejected by a shedder *A*, actuated by the spring *B*, which leaves the shell on the face of the die. As the strip stock is advanced, one side of the opening made by the blanking punch *C* comes in contact with the drawn shell and

pushes it through the slot at *D* in the stripper *E*, so that it falls down the angular side *F* of the die.

The drawing punch *G* has a drilled hole at *H* which serves as an air vent. The blanking die is shown at *I* and the draw-ring at *J*. There are three pressure pins *K*, a bumper retaining rod *L*, and a bumper plate *M*. The blanking punch *C* is 2 3/8 inches in diameter. The drawing punch and die make a 50 per cent reduction in the diameter of the blank in the first operation.

The die for the first redrawing operation is shown in Fig. 3. This die makes a 25 per cent reduction in the shell diameter and starts to form the conical shape. A soft steel punch-holder *A* is attached by four screws to the hardened die *B*. The hardened sleeve *E* acts as a locator for the previously drawn shell, as well as a support for the shell while it is being redrawn. The sleeve *E* is actuated by three pressure pins *J*. The hardened punch *C*, over which the shell is drawn, is held in the recess in die-shoe *G* by the hardened die ring *D* and the soft steel retaining ring *F*. These parts are all bored and turned concentric and are held together by four screws *S*. The drawn shell remains in die *B* until the press ram reaches the top of its

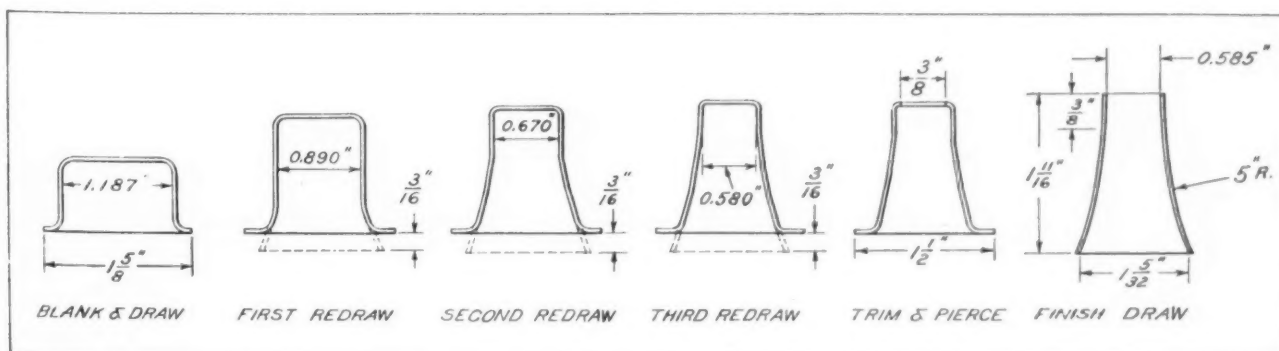


Fig. 1. Steps in the Evolution of a Conical Shell Shown by Cross-sections of Work in the Form in which it Leaves Each of the Dies Illustrated in Figs. 2 to 7

Fig. 4. (Left) Die for Second Redrawing Operation in the Production of Conical Shell

Fig. 5. (Right) Third Redrawing Die for Conical Shell, which Makes 14 Per Cent Reduction in Diameter

stroke, when it is ejected by the knock-out rod *H*.

The third operation is performed on the second redraw die, Fig. 4. This die also makes a 25 per cent reduction in the shell diameter and continues the conical forming operation. The die parts are similar to those shown in Fig. 3. An important feature not found on the other die, however, is the three anti-pressure pins *K*. As shown in the illustration, the heads of these pins rest on the hardened sleeve *E* and are in contact with the face of the hardened die *B*. The length of these pins is such that the metal thickness between the conical and convex diameters of the die *B* and sleeve *E* will be maintained. Until these anti-pressure pins were introduced, it was impossible to redraw a shell properly, as the metal was locked between these surfaces, causing the end to be pulled

out of the shell. The use of the pins *K* eliminated this trouble.

The third redrawing die, shown in Fig. 5, performs the fourth operation, making a 14 per cent reduction in the shell diameter and completing the conical shape above the shell flange and part of the straight neck.

The punch-holder *B* is of mild steel and is attached to the hardened die *C*. The hardened draw punch *D* is held in the recess machined in the die-shoe *G* by three screws. The hardened pressure ring *E* is actuated by pins *F*. The knock-out plug *A* ejects the shell as the press ram ascends to the top of its stroke.

In the fifth operation, the die shown in Fig. 6 trims the flange and

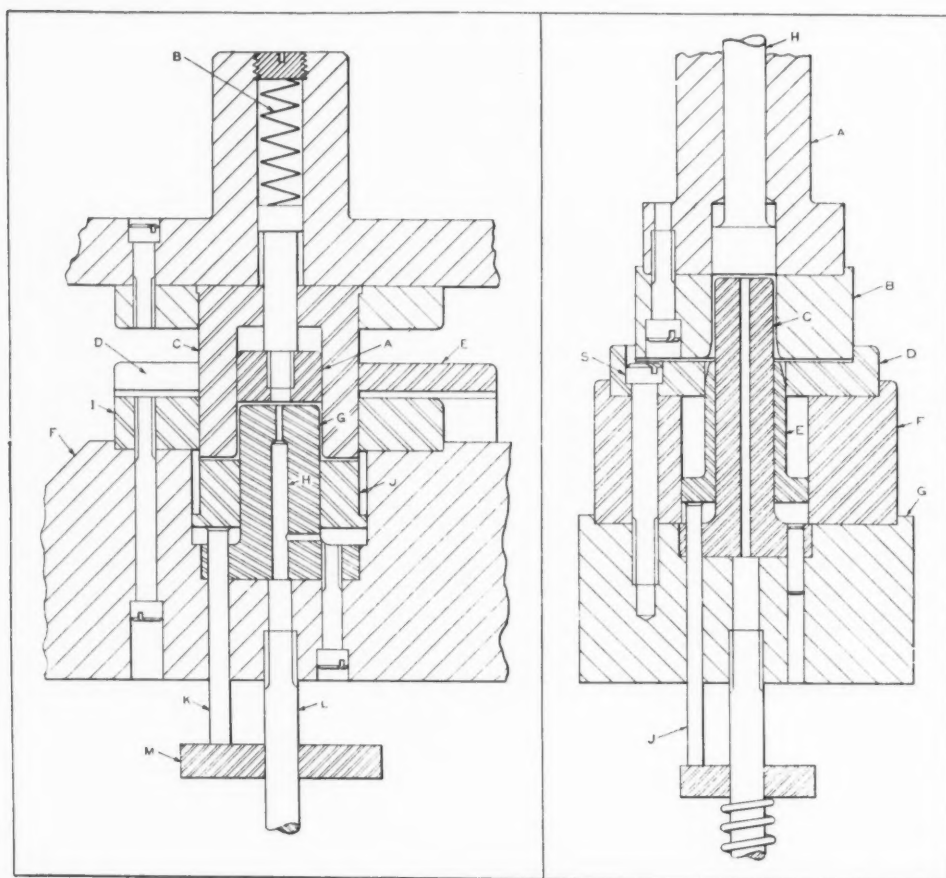


Fig. 2. (Left) Blanking and Drawing Die for First Operation in the Production of Conical Shell from Cold-rolled Steel

Fig. 3. (Right) First Redrawing Die for Conical Shell, which Accomplishes a 25 Per Cent Reduction in the Diameter of Work

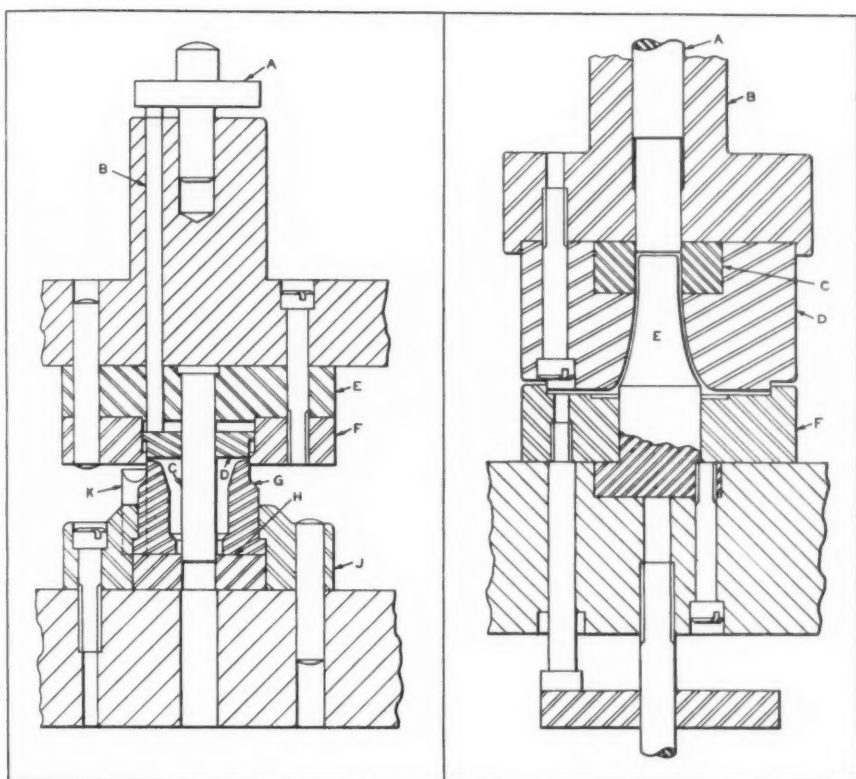


Fig. 6. (Left) Die for Trimming Flange of Shell and Piercing 3/8-inch Hole in the End

Fig. 7. (Right) Die for Completing the Drawing Operations on Conical Shell and Straightening the Flange

pierces the 3/8-inch hole in the end of the shell. The work is placed in the hardened trimming punch *G* which serves also as a nest. The die *F* trims the flange, the scrap being split by the chisels *K*. The hole is pierced by the hardened punch *C* and the inserted die *H*. Trimming punch *G* and die *H* are held in place by the hardened ring *J*. Both the piercing punch *C* and the trimming die *F* are located by the punch retaining plate *E* and are secured to the punch-holder by screws and dowels. As the press ram ascends to the top of its stroke, the shell is ejected by the disk *D*, which is actuated through pins *B* by plug *A* as it makes contact with the knock-out bar of the punch press.

The sixth and concluding operation is performed by the die shown in Fig. 7, which draws the shell flange, thus finishing the conical shape and bringing the shell to the 0.585-inch diameter. Another stroke of the die smooths the entire surface of the shell. The work is located over the hardened draw punch *E* and is finish-drawn by the hardened die *D* and insert *C*. On the up stroke of the ram, the hardened pressure ring *F* strips the shell from the punch and when the ram reaches its top position, the knock-out pin *A* ejects the shell.

Chuck Jaws for Bevel Gear Blanks

By FRED HORNER, Bath, England

Chucks for rings, collars, washers, and gear blanks having single- or double-beveled surfaces require jaws designed to suit the method used in

presenting the tools to the work. Location from the face of a bevel gear blank can be obtained by the jaw shown at *A*, Fig. 1, or a peg may be inserted, as shown at *B*. In some instances, the chuck face serves as the locating medium, as shown at *C*. A centering boss which fits into the recess locates the work in this case.

Various methods are used for chucking gears for grinding the holes, such as arranging three loose blocks to form a ring, which is placed around the gear and then inserted in a split collet. In some designs, a set of balls held in the ring jaw make

contact between the teeth and thus locate the gear while two clamps are tightened. A tapered roller arrangement can be employed in the same way, except that each roller is mounted in a sliding jaw. The holding of internal bevel shapes is accom-

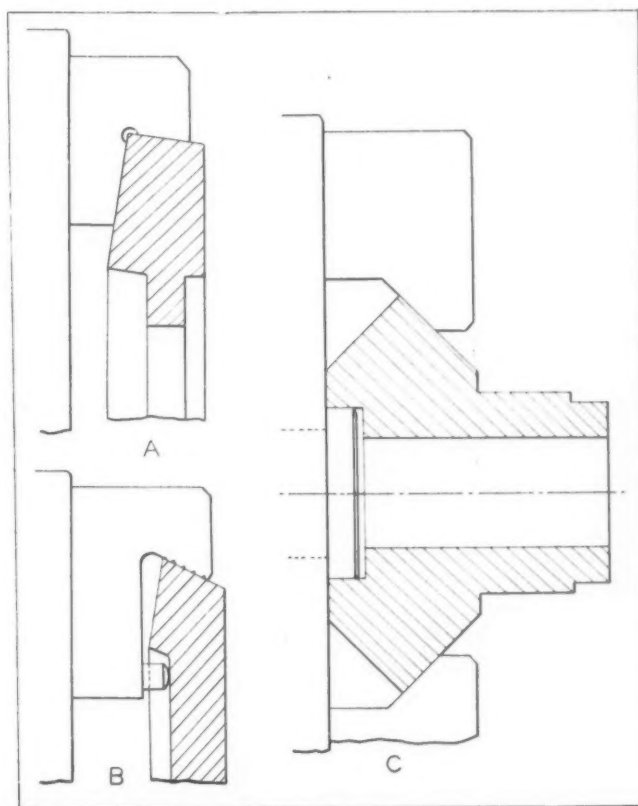


Fig. 1. Chuck Jaws Machined to Fit Bevel Gear Blanks

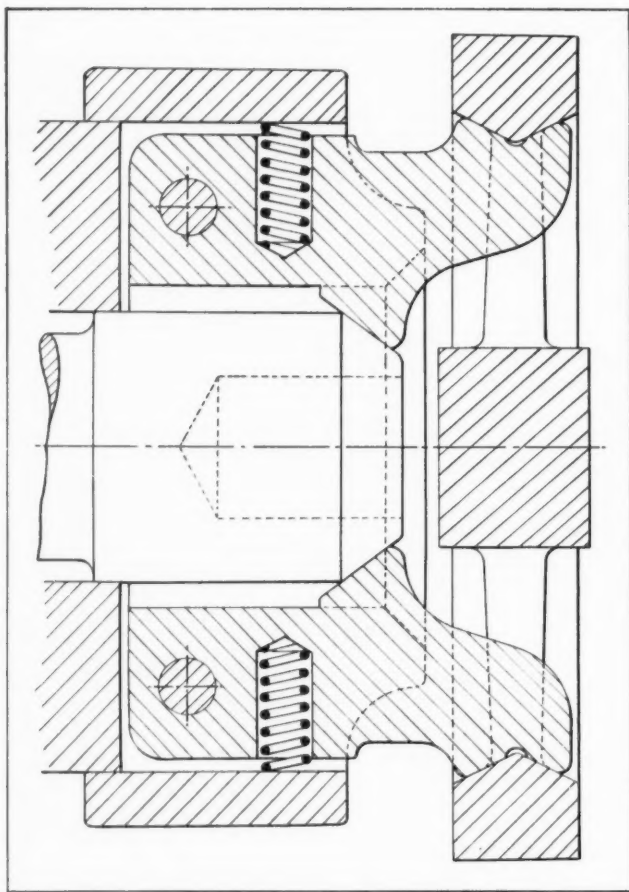


Fig. 2. Push-out Chuck Arranged to Operate Pivoted Jaws

plished by suitably cut sliding jaws. With a draw-back chuck equipment, hinged jaws, as shown in Fig. 2, having springs which return the jaws are applicable.

Flush-Pin Gage for Checking Position of Form-Milled Surface

By FRANK SERRAL

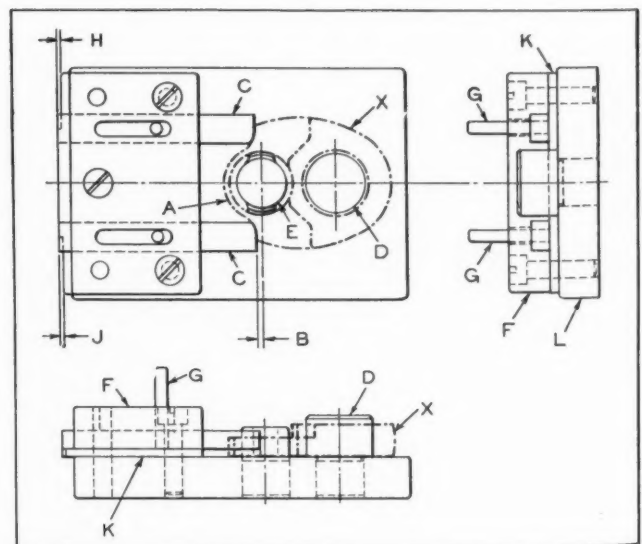
The formed surface *A* on the part shown at *X* in the accompanying illustration is machined at one pass of a form milling cutter. The two flush pins *C* of the gage are used for checking the position and alignment of the surface *A* with respect to the two holes in the work, especially the distance *B*.

The work *X* is mounted on the centralizing stud *D*, and is located radially by the pin *E*, which is flattened so that it makes contact on only two sides of the hole. There is a retaining plate at *F*, in which the two flush pins *C* are mounted. These pins are moved by hand, by means of the small pins *G*, until contact is made with the work, when the user checks at *H* and *J* to determine if the work comes within the allowable limits there indicated. These limiting steps are ground in a thin plate *K*, which is mounted on the baseplate *L* under the flush-pin retaining plate *F*.

How Much of the Time is a Machine Actually Cutting Metal?

In a paper presented before the recent annual meeting of the American Gear Manufacturers' Association, N. M. Du Chemin, assistant manager of the West Lynn Works of the General Electric Co., referred to studies made at the Lynn Works on the actual time that a machine may be engaged in useful work—that is, in cutting metal. "For about five years," said Mr. Du Chemin, "we have been doing some actual measurement of utilization of machines, and, in general, it is our observation that 20 per cent utilization is a very good average. The machines are being worked upon much more than 20 per cent of the time, in many cases over 80 per cent, and in some instances, nearly 100 per cent. However, many of the machines are performing their primary functions only a small fraction of the time, and for the rest of the day they are used as very expensive work benches.

"Let us cite an example. Several years ago, in our diemaking department, it was evident that the jig-borers had become the 'neck of the bottle.' There were always many jobs waiting their turn to be bored. We checked the number of minutes per day that the spindle of the jig-borer was revolving. The measurements indicated that the spindle revolved only an average of sixty minutes in an eight-hour day—12 1/2 per cent utilization. Seven-eighths of the working day we were supplying that mechanic with a \$6500 work bench. The figures so shocked us that we designed and built several inexpensive removable set-up plates upon which the diemakers delivered their work to the jig-borer. This minimized the set-up time on the jig-borer, and increased the utilization of each machine to 72 per cent. We then had the equivalent of six jig-borers to each one in the past, based on past performance of the machine."



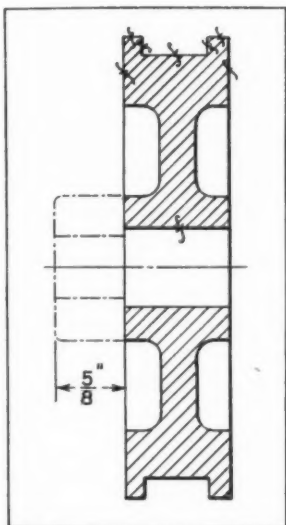
Flush-pin Gage for Checking Position of Formed Surface with Respect to Two Holes

Ideas for the Shop and Drafting-Room

Time- and Labor-Saving Devices and Methods that Have been Found
Useful by Men Engaged in Machine Design and Shop Work

Simple Change in Pulley Design Reduces Machining Costs

In mass production work, the opportunity to obtain large reductions in machining costs by making comparatively simple changes in the design of a part is often overlooked. The accompanying illustration shows how a pulley pattern was changed to facilitate machining by the addition of a "manufacturing" boss.



Addition to Pulley Hub,
as Indicated, Reduced
Machining Costs

The addition of the boss, shown by dot-and-dash lines, permitted the pulley to be machined in one set-up on the lathe, thereby effecting a saving of 30 per cent in the setting-up and handling time. Before the boss was added to the pulley hub, the machining operations consisted of facing one side, boring and reaming the hole with the pulley held in a chuck, then mounting the pulley on a mandrel and facing the other side, turning the outside, and grooving.

Astoria, N. Y.

P. E. VERA

Hardening High-Carbon Steel Tools

The article in March, 1937, *MACHINERY*, page 478, relative to hardening high-carbon tool steel reminded the writer of the difficulty he once experienced in hardening some helical forming tools for brass, which were required to be very hard.

Owing to the peculiar shape of the tools, uneven strains were set up, which caused cracks. These cracks necessitated scrapping tools on which hours of machine work had been spent. After experimenting, however, the writer finally succeeded in obtaining a satisfactorily hardened forming tool. This success was attributed to the practice of immediately dipping the tool in fish oil as soon as the vibrations produced by the work in the quenching water ceased, a light pair of tongs being used to hold the work, so the vibrations could be felt.

Ontario, Calif.

J. HOMEWOOD

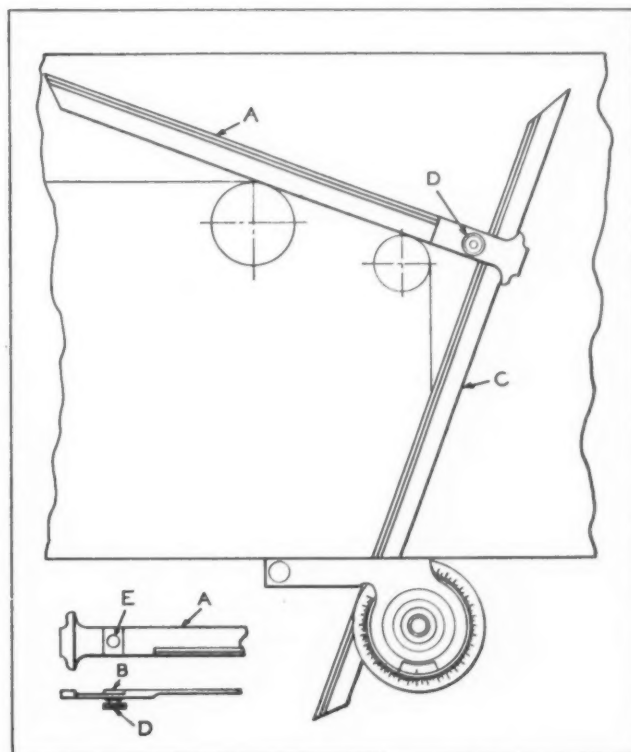
Auxiliary Protractor Blade for Lay-Out Work

In using an ordinary bevel protractor for scribing an oblique line on a templet or on other lay-out work, it is necessary to have two sides of the sheet metal square. With the auxiliary blade shown at A in the illustration attached to the regular protractor blade C, a toolmaker can select any angle desired and lay it out from one side of the templet as indicated, thus eliminating the necessity for squaring up one of the other sides.

The blade A must be accurately made, so that when fitted to the regular protractor blade, it will be square with the edge of the latter member. The blade A is held in position by locking clamp B actuated by an eccentric pin E, the assembly of these parts being completed by pressing knob D over pin E.

The auxiliary blade A can also be used in tool and die work for setting up machines and locating die-blocks and jig parts, as well as for inspecting work requiring the checking of angular positions of lines or surfaces.

Cleveland, Ohio JOHN P. KIRSCHENSTEINER



Protractor Fitted with Auxiliary Blade for Lay-out Work
Requiring Lines to be Scribed at Various Angles

Swiveling Tool for Boring Spherical Seats

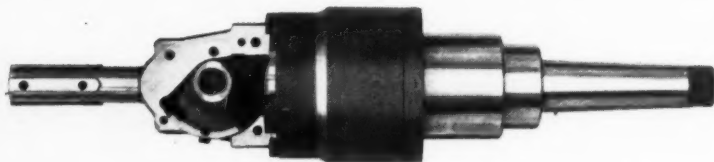


Fig. 1. Single-point Tool for Rough-boring Spherical Seat

TOOLS recently designed by the Gairing Tool Co., Detroit, Mich., for roughing and finishing a spherical seat in automobile transmission cases have features that adapt them to a number of similar applications. The diagram Fig. 2 shows the dimensions of the spherical hole machined by these tools and of a straight hole that is bored simultaneously with the finish-boring of the spherical seat.

Rough-boring of the spherical seat is accomplished with the single-point tool illustrated in Figs. 1 and 3. The distinctive feature of this tool is that after the cutter has been fed to the front edge of the spherical hole, as shown at A, Fig. 3, it is gradually swiveled forward as the tool revolves until it has been fed completely across the spherical surface to the position indicated by the dotted lines B. In taking this cut, the spherical seat is machined to a radius of 2.246 inches. The tool is piloted at the front end by a bushing in the work-fixture.

The cutter A is correctly positioned lengthwise for the beginning of the operation by advancing the entire tool until sleeve C comes in

contact with a finished face of the work. Then the cutter is swung forward as the machine on which the tool is mounted continues to advance bar D. This bar is machined to a fork at the front end, and on one internal side of the fork there is an

angular slot, as indicated at E. This slot is engaged by a roller attached to the swinging arm of holder F in which cutter A is mounted. Holder F swivels about a pin G which extends through both the holder and sleeve H.

As bar D is advanced after sleeve C has come in contact with the face of the work, the roller attached to the arm of holder F moves upward along slot E, and thus swivels the holder and cutter A forward as required to machine the spherical seat. The entire tool is, of course, constantly revolving. The coil spring between sleeve H and bar D insures that cutter A and holder F will be returned to their starting positions when the boring operation has been completed, the tool proper then being withdrawn from the work.

The spherical seat is finish-bored to a radius of 2.254 inches, and the straight hole is simultaneously bored to 2.430 inches, by the tool illustrated

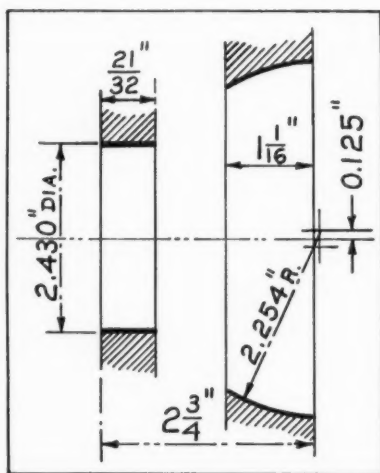


Fig. 2. Dimensions of the Spherical Seat and Straight Hole Machined by the Special Tools Here Described

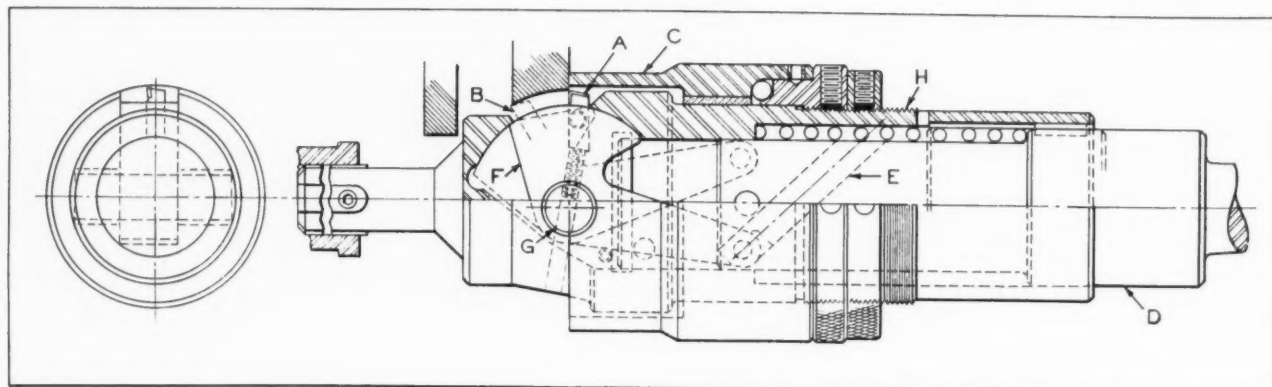


Fig. 3. Assembly Drawing of Special Swiveling Tool Employed for Preliminary Boring Operation on a Spherical Seat of Automobile Transmission Cases

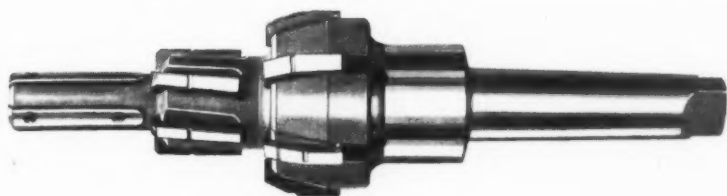


Fig. 4. Combination Tool which Simultaneously Finishes the Spherical Seat and the Straight Hole in Front of it (See Fig. 2)

in Fig. 4. This tool is equipped with inserted blades for machining both holes. It removes stock to a depth of 0.004 inch from the spherical seat,

merely taking a shaving cut. This tool is also piloted in a bushing in the work-fixture, the same as is the swiveling tool shown in Fig. 1.

Imperfect Steel Rings Reject Themselves

THE alloy steel rings used for valve-seats on the exhaust ports of Ford engines are automatically checked for outside diameter, thickness, and cracks on the machine here illustrated. These valve-seat inserts are dumped into a hopper at the right-hand end of the machine and are fed by means of a vertically swinging agitator into chute *A*, down which they roll to gaging units that check them for outside diameter and thickness. In front of these gaging units is a chute *B*, mounted on a spindle which is turned automatically to bring one of three troughs into line with an opening in the machine housing through which the inspected valve-seat inserts are discharged. The movement of the chute spindle is controlled by electrical relays and solenoid switches, actuated by the gage units.

Rings that are under size with respect to the outside diameter are discharged into the rear trough of chute *B*, from which they fall through an opening into chute *C*, which drops them into the right-

hand compartment of container *D*. Rings that fail to meet thickness requirements are discharged into the front trough of chute *B*, from which they fall into chute *E* and roll into the left-hand compartment of container *D*.

The most unique feature of this inspection machine, however, is that rings that are cracked reject themselves. All rings that pass requirements as to diameter and thickness roll the full length of the central trough of chute *B* and fall on anvil *F*. Each ring that is free from cracks will rebound from this anvil into the container at the left-hand end of the machine. However, cracked rings do not rebound high enough to clear the front of this container, and they therefore fall into a box placed in the bed of the machine. This machine inspects valve-seat inserts at the rate of 70 a minute, or 33,600 in an eight-hour day. It is an excellent illustration of the possibility of doing perfectly by mechanical means what can be done only imperfectly by hand labor.

Inspection Machine in which Imperfect Valve-seat Inserts Reject Themselves. Gaging Units Reject all Inserts that Fail to Meet the Requirements as to Diameter and Thickness



Procedure in Designing and Checking the Design of Special Machines

IN a paper read before the American Society of Tool Engineers by Charles J. Martin, of the Gisholt Machine Co., the following points were given for use in designing or checking the design of special and semi-special machines.

1. Make the tool lay-out.
2. Select the type of tools to be used—commercial or standard, as adopted by the customer.
3. Figure the cutting speeds in feet per minute and the feed in thousandths of an inch per revolution, and make an experimental try-out.
4. Design the fixture around the part and the tool lay-out.
5. Determine the amount of travel required for machining the part and for removing tools and worn parts of the fixture as quickly as possible.
6. Design the machine in unit assemblies whenever possible, especially if it is subject to excessive wear and must be replaced often. A spare assembly can then be carried in stock. This is economical when more than one machine of the same kind is in use, such as grinding and precision boring machines, and the complete spindle units can be easily replaced; also machines with ways having traveling slides actuated by hydraulic units that provide for rapid advance, feed, return, and dwell at the end of the feed. These units are manufactured in two types today, the sliding type and the quill type. They are economical, have a high salvage value, and their spindle speeds can be changed easily. The length of stroke and feed rates can be changed quickly by adjusting dogs that operate and control the complete cycle. These units can be mounted in any desired position, and will drive a single tool or a multiple head. They can also be used as prime movers or drivers for other machine units for milling, boring, or similar operations.
7. Check selection of materials for the different parts of the machine very carefully, as there is sometimes a tendency to use one type of steel for all parts. The kinds of castings and steels should be selected and treated according to the wear and abuse they receive.
8. Use a factor of safety of at least 4 or 5 for machines in the automobile industries, where accuracy is of major importance and no vibration is tolerated. The machine should be designed for maximum rigidity and should be heavier than would be required for strength alone.
9. Check the oiling system thoroughly. In many cases, this is left until the design is complete, with the result that trouble is experienced in providing an efficient oiling system in the finished machine.

10. Make one of the ways for sliding heads or tables used for precision work of the vee type, and the other a flat way. These ways should be more than two and one-half times as long as the distance from the vee way to the center of the flat way. The slide should be heavy enough to absorb any vibration caused by the rotating parts or the machining cut. When extreme accuracy is not required, two flat ways or two bars are sufficient to guide any slides.

11. Use taper roller bearings for heavy-duty spindles, and ball bearings for drill spindles or lighter operations and also for precision work. The plain bearing is probably the most accurate bearing available, but it does not have as long a life as anti-friction bearings, and generates more heat, as well as requiring more attention.

12. Take care in selecting the kind of material to be used for the bases and housing. When any degree of accuracy is required, high-grade castings should be used. Many machines are now built of welded steel construction. This is very economical when only one machine is being built that probably will not be duplicated or when close accuracy is not required.

13. Mount reduction gears on anti-friction bearings. They should be designed according to the accepted rule for the required horsepower, but in practice, the face width of the gear should be made at least twice as wide to provide longer life. When the speed of the gear is not to be very high, the oiling system can be of the submerged type. On very high-speed gears, a circulating system should be provided, so that the high-speed gears will not churn the oil and create heat which may cause ultimate failure.

14. As regards the electrical equipment, see that all motors are accessible and not mounted within the housing of the machine, as this would be likely to cause them to overheat. Standard electrical control equipment as manufactured by the various electrical companies should be used. This not only provides economies on new installations, but saves time and expense in the maintenance of equipment in service. The electrical control equipment should not be mounted in the housing of the machine, but outside, or in a separate box. If mounted in the housing of a machine, it is subjected to dirt, chips, heat, and oil leakage, which tends to cause short circuits and may result in serious damage.

15. If machines are to be hydraulically operated, mount the pump and necessary operating equipment in a self-contained unit, including the motor

mountings and oil reservoir. This is a recent development, and is designed in such a way that air can circulate completely around the unit, and little heat is transmitted to the machine proper. The oil passages should be manifolded wherever possible. This eliminates leaks and requires a minimum amount of space. The hydraulic operating valves should be easily accessible for repairs. Designing the machine in units is generally practicable on way, vertical indexing, and vertical turning machines. In the majority of these cases, the self-contained hydraulic unit can be used to advantage.

* * *

Facts on Industrial Accidents

The National Safety Council, 20 N. Wacker Drive, Chicago, Ill., has published its annual booklet "Accident Facts," giving detailed information on accidents in the United States, with a view to centering attention upon preventable accidents and arousing action to reduce accidents of all kinds. Special attention, obviously, is paid to industrial accidents, and to means for safeguarding against them. Copies of the booklet may be obtained at 50 cents each from the National Safety Council.

* * *

In these days, when a great deal of legislation is being passed rather hurriedly, without sufficient time for careful consideration, it is well to remember that no government can make two and two equal five; no government can create something out of nothing; no government can enable a man to lift himself by his boot straps; and no government can repeal natural laws, no matter how many laws it passes.—*Hyde Park Herald*

Revision of Undistributed Profits Tax Urgently Needed

According to an article in *Nation's Business*, the outstanding defects of the present undistributed profits tax are:

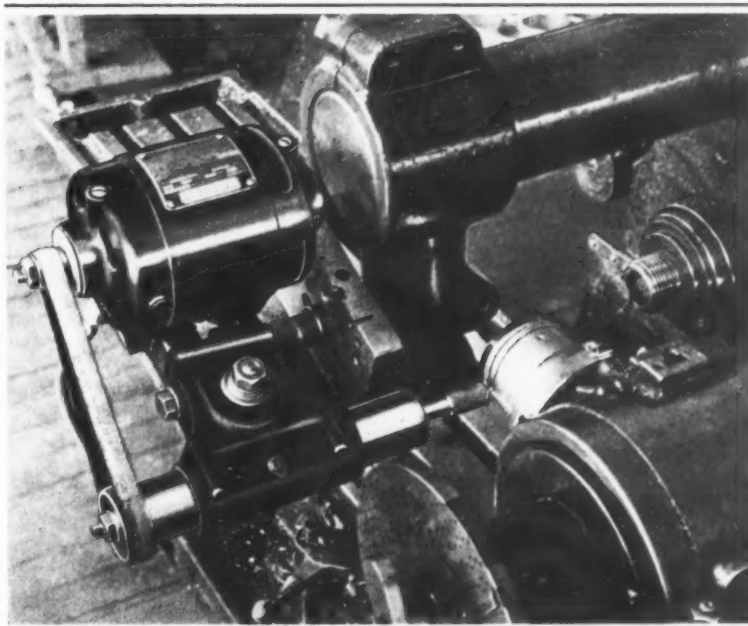
1. Conflict between state and federal laws, most apparent in the case of corporations with impaired capital.
2. Exceptional and unfair burdens placed on corporations with outstanding debts contracted in good faith.
3. No allowance for current earnings used for business expansion and for other appropriate corporate purposes.
4. Failure to provide relief for corporations bound by contracts which do not meet the requirements of present relief provisions, but which, in fact, operate to restrict dividend payments.
5. Establishment of the time of dividend payments at such a date as to impose unreasonable or impossible conditions.
6. Coercion of corporations into doubtful fiscal policies and generally weakening their financial structure.
7. Ambiguous and harsh provisions which supply the basis for excessively restrictive regulations.

In view of these defects, there is urgent need for a revision of this tax law. It hampers industry, and anything that hampers industry hampers the prosperity of the country as a whole.

* * *

The electrical industry produces \$2,000,000,000 worth of machinery, apparatus, and supplies annually, and provides jobs for more than 400,000 workers in the various branches of the field.

The Ingenuity of a Shop Foreman Led to this Application of a Dumore Portable Electric Grinder when a Method had to be Devised for Milling a Helical Groove around Fifty Aluminum Caps. A 1/8-inch Fish-tail Milling Cutter, Held in a Quill in the Grinding Spindle, was Driven at the Proper Speed for the Operation through a Belt which Connected the Grinding Spindle with the Motor





Drilling and Reaming Plymouth Connecting-Rods and Caps

HYDRAULICALLY operated machine tools were recently installed in the Plymouth Division of the Chrysler Corporation, Detroit, Mich., for drilling and reaming the bolt holes in connecting-rods and their caps, and for drilling a dowel hole in both of these parts. The connecting-rods are drilled and reamed in machines of the type illustrated in Fig. 1, which are of single-end design. There is a hand-indexed trunnion at the left end, on each station of which two connecting-rods are loaded as the stations are successively indexed to the operator.

On the right-hand end of the machine, there are two Melling Twin Ram hydraulic units, one of which carries a fourteen-spindle drilling head, and the other an eight-spindle reaming head. Both heads slide in proper alignment on large-diameter bars which are anchored both to the bed of the machine and to the housing of the hydraulic units. In addition, the multiple-spindle heads are piloted by means of bars which engage bushings in the trunnion housing.

The sequence of operations consists of drilling

the 11/32-inch bolt holes in the two connecting-rods to one-third of the required depth, drilling the bolt holes the second third of the required depth, drilling a 3/16-inch dowel hole, drilling the bolt holes completely through the connecting-rods, rough-reaming the bolt holes, and finish-reaming them. The machines used for this operation and their hydraulic units were built by the Snyder Tool & Engineering Co., of Detroit.

Machines of the double-end type, shown in the heading illustration and in Fig. 2, drill, ream, and spot-face the bolt holes in the connecting-rod caps and drill a dowel hole in the caps. These machines are equipped with a hand-indexed trunnion having eight stations. There are two hydraulically operated units on the right-hand end of the machine and one on the left-hand end. One of the units on the right-hand end has a twelve-spindle drilling head and the other an eight-spindle reaming head, while the left-hand unit is equipped with an eight-spindle head for drilling and spot-facing. All three hydraulic units are operated by one starter.

The multiple-spindle heads and the bushing plates with which they are equipped slide on large-diameter bars. The bushing plates are also provided with pilot bars that register in bushed holes in the trunnion housing.

Two connecting-rod caps are loaded on each station of the trunnion. In the next indexed position after the loading, two bolt holes are drilled one-third of their depth in each cap by spindles on the left-hand end of the machine, and at the same time, a 3/16-inch dowel hole is drilled in each cap by spindles on the right-hand end of the machine. At the following station, the two bolt holes of each cap are countersunk and spot-faced by spindles on the left-hand end, and they are drilled one-third of their depth from the right-hand end.

From this point on, all stations of the trunnion are idle with respect to the left-hand end of the machine, while spindles on the right-hand end complete the drilling of the bolt holes and both rough- and finish-ream these holes. The machines for this series of operations were built by H. R. Krueger & Co. of Detroit and equipped with hydraulic units manufactured by the John S. Barnes Corporation, Rockford, Ill.

* * *

Forty years ago Governor Busiel of New Hampshire said that he had no doubt that in the near future, when one went to a livery stable to hire a carriage, one would be asked whether one wanted a "motor carriage or one drawn by a horse."

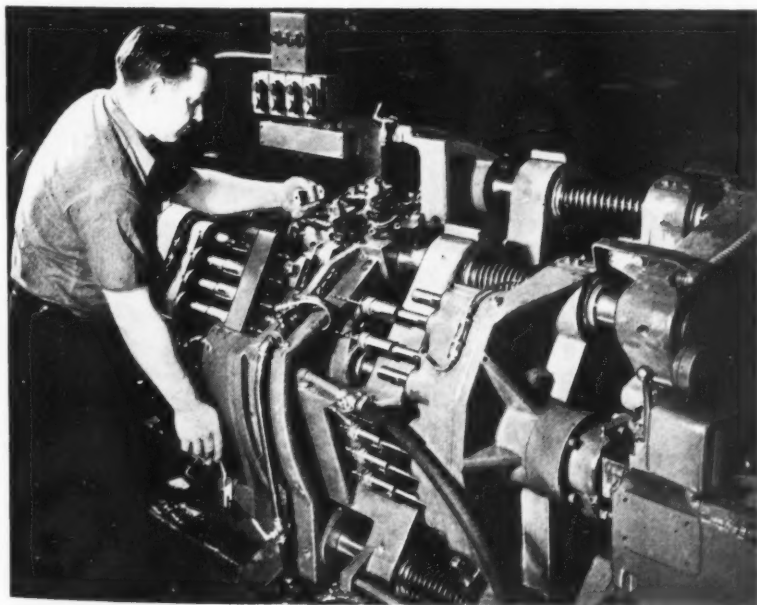


Fig. 2. Double-end Hydraulic Machine which Drills, Reams, and Spot-faces the Bolt Holes of Connecting-rod Caps and Also Drills a Dowel Hole

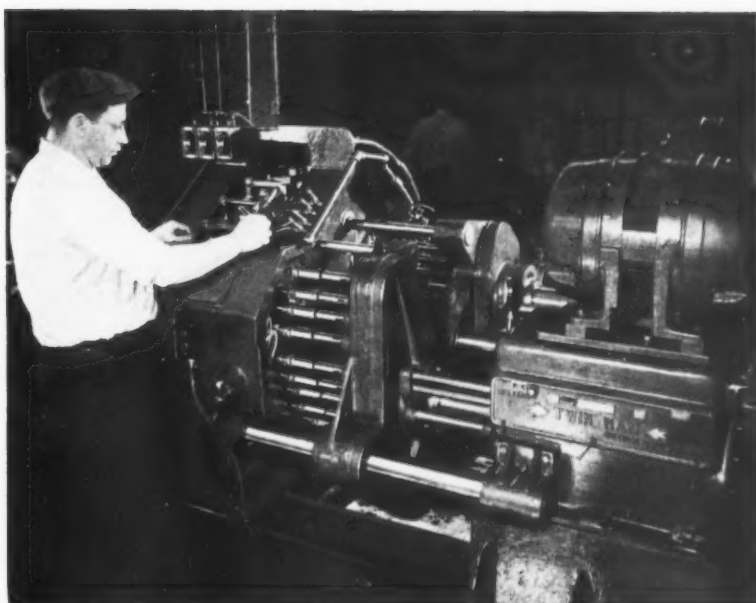


Fig. 1. Drilling and Reaming the Bolt Holes of Plymouth Connecting-rods and Drilling a Dowel Hole

Special Welding Course for Professors

The increasing emphasis being placed on welding as a primary process of construction and manufacture was evidenced by the attendance at a special professors' course in arc-welding design and practice held recently in Cleveland under the sponsorship of the Lincoln Electric Co. The course was attended by twenty-three professors or instructors, representing twenty-one different colleges or trade schools in sixteen different states.

The course, which began June 14 and continued for five days, gave those attending the opportunity to study electric welding intensively, in both its theoretical and practical aspects. The ground covered followed, in general, the advanced five-day course in arc-welding design and practice given regularly at Cleveland by the Lincoln Electric Co., in conjunction with the John Huntington Polytechnic Institute. The subjects covered, under the direction of E. W. P. Smith, nationally known authority on welding, included: The shielded arc, its value and use in design; calculating stress distribution in welded joints; use of rubber weld models and polarized light in study of stress distribution; determining most economical section in changing from cast to arc-welded construction; weld inspection; and checking fusion and penetration. The course also included a metallurgical study of the welding of ferrous and non-ferrous metal. A discussion of the characteristics of the welding arc was illustrated on a screen. Morning and afternoon sessions were held at the Lincoln plant and evening sessions at the John Huntington Institute.

Overcoming Difficulties with Parting Tools

By F. MUIR

PROBABLY more difficulty is experienced with the parting tool than with any other lathe tool. The reasons for this are not hard to find. In the first place, it is difficult to grind this tool to the correct top rake, side clearance, and cutting angles. Secondly, it must be set with almost micrometer accuracy to secure even a moderate degree of efficiency. Last, its weakness prevents using speeds and feeds that are accepted as quite ordinary for any other type of lathe tool.

No tool varies in performance in the hands of different operators as much as the parting tool. Every user of a parting tool, at one time or another, has found a way to make it work better on some particular job, and the writer believes that his discoveries along this line will be of interest to others. A high percentage of parting tool breakage occurs when cutting off pieces from stock having a hole that is not concentric with the outside.

Parting Tools for Pipe and Tubing

Iron pipe, tubing, and certain castings are examples of work that may not be round or that may have holes that do not run true with the outer surface. In such cases, the tool cuts through the work unevenly and is very likely to catch and break. The writer has found a double parting tool to be the best solution for this kind of problem. It is forged out of one piece of tool steel, both cutting edges being bent inward so that they face each other, and the distance between the cutting ends being equal to the wall thickness of the work.

The tool may best be described as consisting of a bent inside parting tool with an outside bent parting tool clamped to it so that the cutting edges face each other. With a double tool of this kind, the inside tool is first used to true up the spot where the piece is to be cut off, after which the outside tool is fed in to cut off the part. When the outside tool breaks through into the true surface produced by the inside tool, there is no longer any danger of the tool catching and breaking.

The importance of setting the tool square with the work becomes greater as the depth of the cut increases. It is a mistake to depend on the eye alone in setting the tool, because the eye is easily deceived by any nearby object, such as a wrench, for example. If the chuck is in good condition, the face of one of the chuck jaws forms an ideal setting surface. The side of the tool is set parallel with the jaw face, allowing for a slight side clearance. Sometimes the end of the work can be used

as a guide in setting the tool, provided it has enough surface to show when the tool is properly aligned. Setting the parting tool carefully is very important.

How to Overcome Chatter

Chatter is another disagreeable feature of parting tools and the cause of much delay in cutting off work. It may be the result of a loose bearing or ways, too much overhang of the tool, or a speed that is too fast for the material. The writer has found cast iron to be the worst offender in this respect. Chatter can usually be overcome by reducing the speed and giving the tool a slight top rake for a distance of about 1/4 inch. Sometimes chatter occurs because the feed has been stopped momentarily and the tool allowed to rub on the revolving work. This kind of chatter can be eliminated by reducing the speed and continuing with as heavy a feed as possible.

Chatter may be due also to the use of a tool that is too light for the cut. If this is the cause of the trouble, pressing down firmly on a wrench placed on the back end of the tool will often help. A peculiar feature of the parting tool is the way it behaves on different lathes. It does not lend itself readily to the borrowing habit, because it often fails to function properly when used on any machine other than the one for which it was ground. The small amount of side clearance allowable is mainly responsible for this behavior.

One toolpost may be canted slightly one way, another may be straight, and still another canted the other way. Naturally, as every operator grinds a little off the side to suit his own lathe, there soon will be nothing left to grind. There is another reason why parting tools should not be lent. The top rake varies considerably for different materials, and if every borrower changes the angle of the top rake to suit his own job, the life of the tool will be short.

Some stock is so tough that any parting tool used will jam before it has traveled very far. In such cases, the writer proceeds as follows: First cut into the work a short distance, then back out the tool and move it over a distance equal to about half its width, and cut in again to the same depth. This operation, repeated until the piece is cut off, enables the job to be done without jamming, because there is always plenty of side clearance. This method wastes a lot of material in the cut and takes longer, but it prevents the breakage of tools.

How Machine Tools Serve Us is Portrayed at Great Lakes Exposition

HOW Machine Tools Serve You" is the subject of an exhibit of the National Machine Tool Builders' Association at the Great Lakes Exposition, which is being held for the second year in Cleveland. This exhibit demonstrates the importance of machine tools in building all the equipment that makes possible modern transportation and communication facilities, modern homes, and the thousands of articles that make living today more comfortable. It shows how machine tools contribute to each phase of everyday life.

The first panel at the left in the illustration relates to recreation; it points out that machinery has increased leisure by decreasing the hours of work. It shows that, whereas in 1899, the average number of hours worked in industry was 56 per week, in 1937 it is only 40. Another panel draws attention to the fact that the implements which help the farmer to feed the nation are built by machine tools. The next panel emphasizes the fact that machine tools bring within the reach of the average pocketbook the appliances that make for comfort in the home, such as electric refrigerators, washing machines, radios, vacuum cleaners, and electric irons.

An animated chart demonstrates that machinery has made jobs grow faster than population. It shows that while population has tripled since 1870,

there are today four times as many jobs. The central panel is a mural painting of a typical machine shop scene, after which there is a second animated chart which emphasizes the fact that today's dollar—earned with less effort than in past years—buys more and better goods.

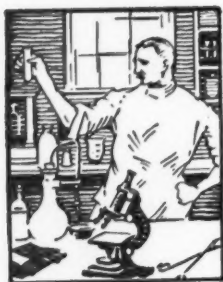
Education is the subject of the next panel, which shows that, because the head of the family earns higher wages, he can keep his children in school longer. It shows that, while in 1870, only 37 per cent of the children between five and seventeen years of age were in public schools, in 1936, the children in school between these ages had increased to 81 per cent. The next panel shows that all forms of modern transportation are produced by machine tools, and emphasizes the fact that the transportation industries employ over six million persons. The final panel in the exhibit shows that machines have more than doubled factory jobs since 1899. In that year, approximately five million persons were employed in factories, whereas in 1937, the figure is close to twelve million persons.

In view of all these facts, the frequent utterances of men prominent in public affairs to the effect that the machine has been a handicap and menace to the average citizen become rather meaningless. A better understanding of the economics of the machine age is needed.



Exhibit of the National Machine Tool Builders' Association at the Great Lakes Exposition

MATERIALS OF INDUSTRY



THE PROPERTIES AND NEW APPLICATIONS OF MATERIALS USED IN THE MECHANICAL INDUSTRIES



Nickel- and Chromium-Finished Flat Steel Wire with Round Edges

Flat steel wire with round edges, prefinished with chromium or nickel, has been made available by the American Nickeloid Co., Peru, Ill., for "dressing up" a variety of products. This wire, for example, may be used as a trimming for bird cages, clocks, furniture, and electrical appliances.

Round-edge flat wire can be obtained in all standard widths and lengths, with either a bright or a satin finish. It can be readily formed, spot-welded, and soldered without scratching or otherwise marring the finish.

Lacquer Finishes that Do Not Chip when Coated Metal is Worked

Cellulose type flexible lacquer enamels that can be sprayed on strips or sheets of brass, steel, aluminum, and other metals prior to forming the sheet material into a large variety of products have been developed by the Roxalin Flexible Lacquer Co., Inc., Elizabeth, N. J. These finishes are so flexible that the coated stock will undergo heavy blanking, embossing and forming operations without flaking or chipping. The illustration shows a number of parts coated with these enamels.



The new enamels, which are known by the trade name Blue Knight, are sprayed in one coating directly on bare clean metal without the use of a primer. They are available in black and colors, in aluminum, and in a taupe or neutral shade that does not show fingerprints, dust, or scratches. These enamels air-dry within fifteen minutes. Baking type enamels for similar uses are also made by the concern.

Acmeloy Metal—an "Alloy Treated" Cast Iron

Acmeloy Metal is the name that has been given to a group of cast irons being made to a number of engineering specifications to suit various uses. It is produced by the Acme Foundry & Machine Co., Coffeyville, Kan., under a licensed arrangement with the Sorbo-Mat Process Engineers, St. Louis, Mo. Fundamentally, Acmeloy Metal is an alloy of iron and carbon, with silicon and manganese added. The composition can be varied over a wide range; however, the chemical constituents generally fall within the following limits: Total carbon, 2.75 to 3.35 per cent; silicon, 1.00 to 1.75 per cent; manganese, 0.65 to 1.75 per cent; sulphur, less than 0.15 per cent; and phosphorus, less than 0.20 per cent. The manufacturer states that the metal should not be considered an alloy cast iron, but rather an "alloy treated" iron.

By varying the composition, the physical properties can be altered to suit requirements as to strength; toughness; hardness; machineability; resistance to heat, corrosion, and abrasion; and endurance limit. The range of some of the physical properties is as follows: Tensile strength (as cast), from 30,000 to 60,000 pounds per square inch; tensile strength (heat-treated), 75,000 to

*Parts Finished with Blue Knight
Lacquer Enamel, the Speedometer
Dial being Stamped from Painted
Stock*

85,000 pounds per square inch; compressive strength (as cast), 125,000 to 175,000 pounds per square inch; endurance limit, 15,000 to 28,000 pounds per square inch; Brinell hardness number (as cast), 175 to 275; and Brinell hardness number (as hardened), 400 to 600.

Acmeloy Metal is claimed to be free from hard spots, white edges and corners, as well as spongy areas, and to be uniformly hard throughout all sections, regardless of thickness.

Chloroprene Rubber Applied in Noiseless Bearings

A bearing that is insulated against noise and vibration has been designed by the Dodge Mfg. Co., Mishawaka, Ind., primarily for use by manufacturers of air-conditioning and heating equipment intended for homes, offices, and public buildings. In this bearing, the vibrations and noise resulting from unbalanced rotors, couplings, and shafts are cushioned by bands of Neoprene, a chloroprene rubber manufactured by E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. These bands are inserted between the inner unit of the bearing and its outer casting. The rubber bands also provide for self-alignment of the shaft and the bearing.

Neoprene was adopted for the insulation, not only because it possesses the necessary resilience for absorbing vibration, but also because it has the ability to withstand the disintegrating effect that oil at high temperatures has on some materials. The bearing is self-lubricating, oil for the shaft being drawn by capillary action from a reservoir.

Nickel Ferrous and Non-Ferrous Metals Used for Aircraft Engines

The materials used by the manufacturers of aircraft engines to meet the rigid requirements of weight-power ratios in engine construction were discussed by J. B. Johnson, chief of the material branch, Air Corps, Wright Field, in a paper read before the annual meeting of the Society of Automotive Engineers held recently in Detroit. Mr. Johnson pointed out that because of this basic limitation the various materials are selected subject to

Table 1. Typical Nickel-Alloy Steels Used in Aircraft Engine Construction

Part	S.A.E. No.
Bolts, studs, nuts, shafts.....	2330
Connecting-rods, gears.....	2340
Gears, piston-pins.....	3115
Bolts, studs, shafts.....	X-3140
Crankshaft, drive-shafts.....	3240
Gears, pins.....	3250
Gears, cams, crankshaft.....	2515
Gears, drive-shafts, cams.....	3312
Crankshaft, connecting-rods.....	4340
Exhaust manifolds, supercharger casing...	30905
Valves, inlet.....	Cr-Ni-Si
Valves, inlet and exhaust supercharger buckets.....	Cr-Ni-W-Si

the following requirements, which are given in the order of their importance.

1. Mechanical properties at operating temperatures.
2. Corrosion resistance for parts in contact with fuel or the products of combustion.
3. Uniformity and freedom from soft spots, cracks from heat-treatment, and magnaflux indications.
4. Suitability for fabrication by the methods and equipment available to manufacturers.
5. Machineability.
6. Cost.

A variety of nickel alloys are used to meet these needs. The oil-hardened 3 1/2 per cent nickel and nickel-chromium steels are generally employed for such parts as bolts, studs, connecting-rods, rocker arms, and small shafts. The hardness of these parts may vary from Rockwell C-25 for nuts to C-55 for piston-pins. In the case of larger forgings, such as crankshafts and propeller hubs, molybdenum is added to provide greater depth hardening and machineability. The steels selected for parts subjected to suddenly applied loads and wear, such as valve rollers, starter shafts, gears and cams, are generally casehardened.

Table 1 lists the various aircraft engine parts that are made from nickel-alloy steels and gives the corresponding S A E number of the steels commonly used for those parts. The analyses of these steels and their physical properties can be obtained by reference to MACHINERY'S HANDBOOK. Table 2 lists the engine parts made from non-ferrous metals containing nickel and gives the physical properties of these alloys.

Table 2. Nickel-Alloyed Non-Ferrous Metals Used in Aircraft Engine Construction

Part	Material	Nickel, Per Cent	Tensile Strength, Pounds per Square Inch	Yield Strength, Pounds per Square Inch	Elongation in 2 Inches, Per Cent	Brinell Hardness
Pistons.....	Aluminum Base (Sheet)	2.0	55,000	35,000	8	95
Pistons.....	Aluminum Base (Forgings)	1.0	55,000	40,000	5	100
Cylinder heads, pistons, bearings.	Aluminum Base (Castings)	2.0	32,000	18,000	1	95
Pistons.....	Aluminum Base (Castings)	2.0	32,000	18,000	—	100
Valve seats.....	Aluminum Base (Castings)	5.0	—	—	—	200
Valve seats, propeller cones.....	Copper Base (Castings)	5.0	85,000	—	3.5	230
Exhaust valve guides.....	Copper Base (Castings)	4.0	—	—	—	45
Spark plug electrodes.....	Manganese Nickel	97.0	—	—	—	—
Exhaust equipment.....	Inconel	70.0	80,000	30,000	25	—

NEW TRADE



LITERATURE

Lathes

SOUTH BEND LATHE WORKS, 777 E. Madison St., South Bend, Ind. New edition of machinists' manual entitled "How to Run a Lathe," containing 160 pages of information on the fundamental operations of modern lathe practice. Instructions on every phase of lathe work are given, illustrated by more than 300 engravings. Besides dealing with all types of lathe work and showing the proper set-up for different kinds of jobs, the book includes a great amount of useful shop information of a general nature, such as tables of cutting speeds of metals, application of lathe tools, cutting screw threads, taper turning and boring, milling and keyway cutting, bushing work, gear-cutting, proper application and types of drives, etc. A nominal charge of 25 cents is made for the book.

Roller Bearings

TIMKEN ROLLER BEARING CO., Canton, Ohio. Revised edition of the conveyor section of the Timken Engineering Journal, which has been expanded to include other forms of transfer equipment. Typical suggested lay-outs for the application of Timken bearings to all types of belt and pan conveyors are presented. A table of approved loads and fitting practices for bucket and pan conveyor wheel bearings is included. Complete data for the use of Timken 2 1/4-inch and 3-inch standard tubes and 2 1/4-inch ground tubes are given. In this edition, new material on self-contained closure assemblies has been added, as well as sixteen pages covering Timken bearing applications to gear drives for conveying equipment, rope rollers of various types, aerial tramway sheaves, I-beam trolleys, etc.

Arc-Welding Equipment

LINCOLN ELECTRIC CO., Cleveland, Ohio, is distributing a revision of the engineering drafting-room chart brought out last year. The new chart will include the latest weld symbols adopted by the American Welding Society in May. Other data given on the chart includes illustrations

*Recent Publications on
Machine Shop Equipment,
Unit Parts, and Materials.
Copies can be Obtained
by Writing Directly to
the Manufacturer*

and information about the sixteen types of joints for arc-welding; suggestions for better arc-welded design; sketches explaining the nomenclature of welds; and a comparison of riveted and welded drawings. Information that should prove useful in designing for arc-welding comprises tables giving properties of base metals, weld metals, electrode metals for hard facing, length of fillet weld to replace rivets, and safe allowable loads for fillet welds in shear.

Grinding Wheels

NORTON CO., Worcester, Mass., is distributing an ingenious device known as a "Grinding Wheel Selector" for tool-rooms. This comprises a celluloid envelope on which are printed the names of various tools such as arbors, broaches, boring tools, milling cutters, dies, drills, lathe tools, etc. In selecting the proper wheel to use for grinding a certain type of tool, a sliding card inside the envelope, having a blue dot on it, is pulled out until the blue dot comes opposite the name of the tool to be ground. Grinding wheel specifications then appear in windows in the celluloid envelope. Recommended wheel speeds, in surface feet per minute, for various classes of grinding are also given, as well as data on grinding cemented-carbide tools.

Lighting Equipment

GENERAL ELECTRIC VAPOR LAMP CO., 893 Adams St., Hoboken, N. J. Bulletin 520, entitled "Greater Lighting Efficiency," giving information about the improved horizontal Cooper Hewitt lamps which have

been redesigned for better industrial lighting, particularly for precision work of all kinds. In a section of engineering data, valuable information is given for computing the proper spacing of Cooper Hewitt lamps to obtain any given illumination level. In addition, photometric ratings for both the 275- and the 350-watt lamps are given, as well as the essential dimensions and lay-out of lamp suspension.

Steels

LU DLUM STEEL CO., Watervliet, New York. Catalogue entitled "Fine Steels by Ludlum," containing a number of new charts, conversion tables, and other useful information for users of steel. Included are a tool steel finder, showing how to select the correct tool steel for a particular job; also a stainless steel finder, accompanied by a table showing the comparative resistance of each grade of stainless steel to various corrosive agents. Information is included on Nitralloy and special products, such as hollow drill steel, magnet steel, welding rods for hard-surfacing, etc.

Welded Piping

THE LINDE AIR PRODUCTS CO., 205 E. 42nd St., New York City. Handbook entitled "Design of Welded Piping," containing 200 pages on the design and lay-out of piping for welded connections. Among the subjects of interest to engineers are fundamentals of welded joint design; welding metallurgy; standard welded pipe connections; design data on welding cast iron, galvanized iron, stainless steel, and non-ferrous piping; advantageous lay-out; fabrication and erection considerations; welded anchors and supports; and welding speeds.

Washers and Stampings

WROUGHT WASHER MFG. CO., 2100 S. Bay St., Milwaukee, Wis. Special washer data chart, printed on heavy bristol board suitable for hanging in industrial plants, containing complete size and dimension data of the entire range of standard wrought washers, including outside diam-

eter, inside diameter, gage and fractional equivalent, and pieces per pound. Requests for this chart should be submitted to the company on firm letter-heads.

Grinding Wheels

NORTON Co., Worcester, Mass. Booklet entitled "Disk Grinding—a Production Operation," describing the application of disk grinders as production tools. The various types of disks used for different classes of work are illustrated and described, and a table of recommendation lists the correct wheel to use for the more common applications. A section is included on cylinder type wheels for vertical- and horizontal-spindle surface grinders and plain grinders.

Bronze Graphited Bearings

JOHNSON BRONZE Co., New Castle, Pa., is distributing a wall card covering the complete line of Johnson cast-bronze graphited bearings and bushings. This reference chart gives complete information on over 200 sizes and data covering their applications, tolerances, and alloys. The card is intended to be hung on the wall to provide quick reference for design engineers and others who have occasion to make use of this information.

Roller Chains and Sprockets

WHITNEY CHAIN & MFG. Co., Hartford, Conn. Catalogue V-125, containing complete data, including list prices, dimensions, horsepower ratings, etc., of Whitney stock and made-to-order roller chains and sprockets. The catalogue also contains useful information for the designer of roller chain drives, such as calculation of chain length, chain and driving sprocket selection table, etc.

Thread-Cutting Equipment for Railroad Shops

LANDIS MACHINE Co., INC., Waynesboro, Pa. Bulletin that features the use of Landis thread-cutting equipment in railroad shops, not only in the United States but throughout the world. Complete specifications are given for Landmaco single-spindle and double-spindle threading machines, as well as for Landmatic and Lanco die-heads. A table of staybolt production data is included.

Combination Turning Tools

R & L TOOLS, 1825 Bristol St., Nicetown, Pa. Catalogue descriptive of the R & L combination turning

tool, which can be used for either right-hand or left-hand turning, or both, drilling, centering, reaming, and chamfering. Many different applications of this tool are shown, and information is given on setting and adjusting it.

Contour Sawing and Filing Machines

CONTINENTAL MACHINE SPECIALTIES, INC., 1301 S. Washington Ave., Minneapolis, Minn. Circular illustrating and giving specifications of two models of the "Doall Metal-master" for contour machining. Some interesting examples of contours machined with this equipment and the time required are included.

Nibbling Machines

ANDREW C. CAMPBELL DIVISION OF THE AMERICAN CHAIN & CABLE Co., INC., Bridgeport, Conn. Folder entitled "Why Not Nibble It?" explaining how Campbell nibblers can be used for cutting odd shapes of ferrous and non-ferrous metals economically and for producing similar parts in quantities up to several hundred, where cost is a factor.

Tempering Furnaces

LEEDS & NORTHRUP Co., 4921 Stenton Ave., Philadelphia, Pa. Circular describing how the physical qualities of screws, bolts, etc., are kept uniform in a large bolt plant by the use of the Homo tempering, normalizing, and annealing furnace. Other examples of the use of Homo tempering are illustrated.

Flexible Lacquer Enamel

ROXALIN FLEXIBLE LACQUER Co., INC., Elizabeth, N. J. Bulletins descriptive of two cellulose type air-drying flexible lacquer enamels for low-cost finishing. One, known as "Blue Knight Leaflex 5900," is an aluminum coating for metals; the other, "Blue Knight Blax," is a black or colored coating for metals.

Boring-Bars and Reamers

GISHOLT MACHINE Co., 1209 E. Washington Ave., Madison, Wis. Bulletin containing complete specifications covering the Gisholt boring-bar with patented spiral groove for clearing chips quickly, and Gisholt manufacturing reamers of the solid adjustable type.

Electric Motors

CENTURY ELECTRIC Co., 1806 Pine St., St. Louis, Mo. Circulars 1032 and 1033, illustrating and describ-

ing, respectively, slip-ring motors of 1 to 350 horsepower, and direct-current motors of 1 to 300 horsepower.

Indicating and Controlling Equipment

BROWN INSTRUMENT Co., Wayne and Roberts Aves., Philadelphia, Pa. Bulletin 91-1, on the Brown Opti-matic system, in which an automatic optical pyrometer is utilized for measuring surface temperatures of hot bodies in motion or at rest.

Rubber-Like Corrosion-Resistant Material

E. I. DU PONT DE NEMOURS & Co., INC., Wilmington, Del. Booklet descriptive of "Neoprene," an engineering material with rubber-like properties which resists the deteriorating effects of oil, heat, sunlight, chemicals, and oxidation.

Wire Straightening and Cutting Equipment

LEWIS MACHINE Co., 1592 E. 24th St., Cleveland, Ohio. Bulletins 2-C and 8-C, illustrating and describing the line of automatic wire straightening and cutting machines made by this concern.

Electric Heat-Treating Furnaces

HEVI DUTY ELECTRIC Co., Milwaukee, Wis. Bulletins HD-537 and MU-637, covering Hevi Duty electric muffle furnaces and multiple-unit furnaces, respectively, for laboratory use and light tool-room work.

Vibration Testing Equipment

SUNDT ENGINEERING Co., 4278 Lincoln Ave., Chicago, Ill. Bulletin 5137, describing the many industrial applications of the Neobeam Oscilloscope, a vibration and noise testing machine.

Monel Wire Screen

INTERNATIONAL NICKEL Co., INC., 67 Wall St., New York City. Bulletin H-3, containing data on the various styles and applications of Monel wire screen and filter cloth.

Rotary Files

M. A. FORD MFG. Co., Davenport, Iowa. Bulletin 105, containing illustrations of the various styles and sizes of hand-cut rotary files made by this concern.

Detachable Electric Instruments

WESTINGHOUSE ELECTRIC & MFG. Co., East Pittsburgh, Pa. Catalogue

Section 43-600, describing a new line of detachable instruments for outdoor and indoor service.

Hoists

MYERS ENGINEERING EQUIPMENT Co., 3947 W. Pine Blvd., St. Louis, Mo. Circular descriptive of the new A-C "Jack It Up" hoist with a capacity for handling loads of 4000 pounds.

Heat-Resistant Alloys

COLMONOY INC., Los Nietos, Calif. Catalogue covering the line of wear-resistant, corrosion-resistant, and heat-resistant alloys and overlay metals known as "Colmonoy."

Time Control

NATIONAL ACME Co., Cleveland, Ohio. Bulletin 3707, illustrating and describing the Chronolog, the Chronocycler, Namco super-sensitive switches, and Namco solenoids.

Threading Machines

LANDIS MACHINE Co., INC., Waynesboro, Pa. Circular pointing out the features of Landmaco threading machines fitted with Lanco die-heads.

Stainless Steel Soldering Flux

The Ruby Chemical Co., Columbus, Ohio, manufacturer of Rubyfluid soldering flux, has brought out a stainless steel soldering flux. The new flux has been placed on the market after several years of experimentation, tests, and actual use in industrial plants. It requires no special soldering equipment or solder.

* * *

Only the uninformed believe that there is some limitless source out of which higher labor costs, resulting from shortened working hours, can be paid without expense to workers themselves and the consuming public. Consumer purchasing power is dependent as much upon prices as upon wages, and only by increasing the spread between the two is the economic well-being of the nation improved. High wage rates are a delusion when they are attained without increasing volume of production or improving efficiency sufficiently to prevent prices from rising proportionately.—*John W. O'Leary, president, Machinery and Allied Products Institute.*

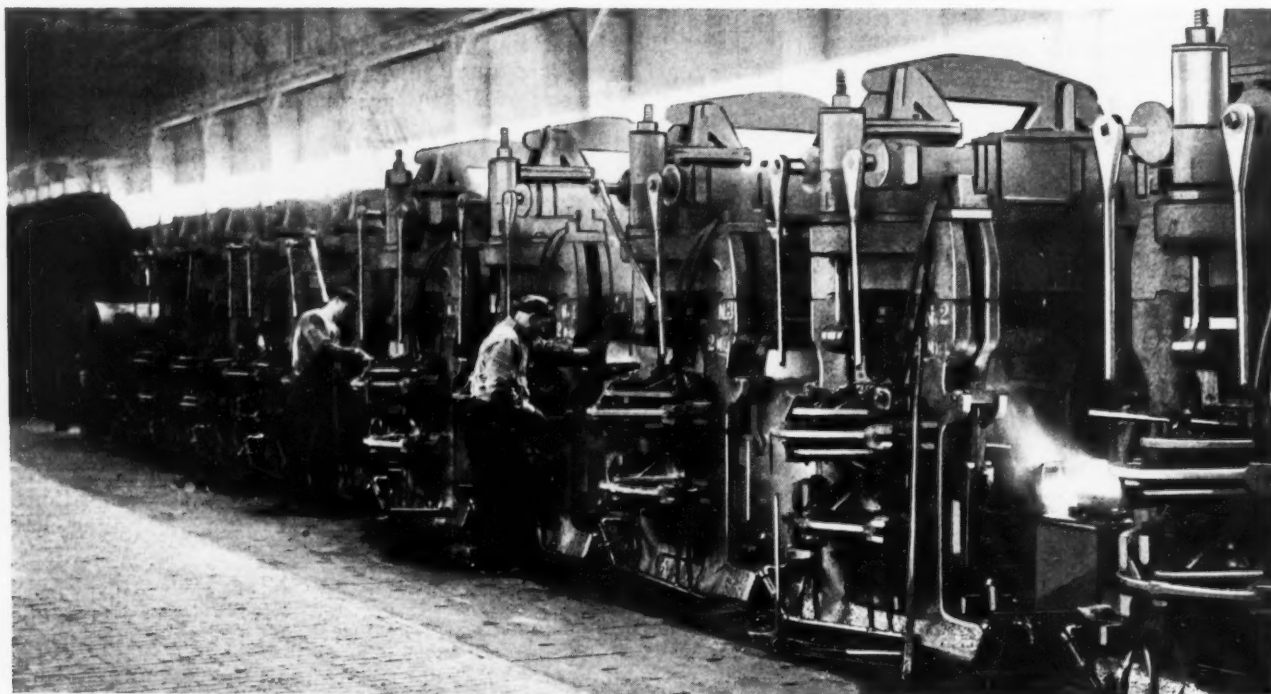
Carboloy Wheel-Dresser Prices Reduced

Carboloy Company, Inc., 2987 E. Jefferson Ave., Detroit, Mich., manufacturer of Carboloy cemented-carbide tools, dies, and wheel-dressers, announces a reduction in the price of Carboloy diamond-impregnated wheel-dressers. It is also announced that due to improved manufacturing methods, the number of standard dressers has been reduced from nine to three. A new revised catalogue DR-37, covering these wheel-dressers, has just been published.

* * *

Opportunities in Peru for American Industrial Machinery

American manufacturers of industrial machinery and equipment interested in selling their products in Peru are invited to send their catalogues, price lists, and full data in duplicate to the Peruvian Consulate, 2314 Locust St., Philadelphia, Pa. The Consulate states that Peru offers exceptional opportunities today for American industrial machinery and equipment.



One of Two Continuous Rod Mills Recently Installed in the Joliet, Ill., Plant of the American Steel & Wire Co. Every Forty Seconds, a No. 5 Rod, Nearly a Mile in Length, Leaves the Final Stand at a Speed of Over 3400 Feet a Minute. Each Mill Consists of Nineteen Roughing, Intermediate, Flying-shear and Finishing Stands, All of which are Equipped Throughout with Anti-friction Bearings, a New Feature in Rod Mill Construction

Shop Equipment News

Machine Tools, Unit Mechanisms, Machine Parts, and Material-Handling Appliances Recently Placed on the Market

Rivett Internal Grinder for Medium- and Large-Sized Tool-Room Work

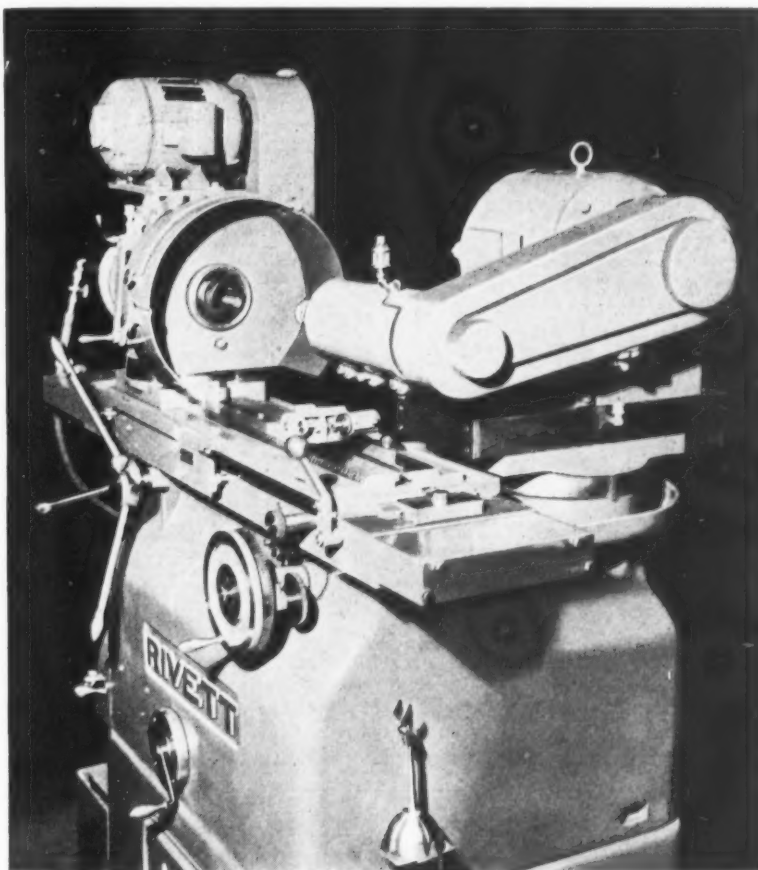
Straight, bevel, two-angle, or both straight and bevel grinding can be performed with one setting of the work in a No. 112 precision internal grinder that is being introduced on the market by Rivett Lathe & Grinder, Inc., Brighton, Boston, Mass. This machine is primarily designed for medium- and large-sized tool-room work. When equipped with a low-speed grinding spindle carrying a wheel up to 6 inches in diameter by 1/2 inch face width, the machine can also be used for external grinding. The simplicity of its design makes it readily applicable to a wide variety of work.

Single-bevel or single-taper work is ground by swiveling the work-head or the table top slide. Combined straight and angle grinding can be readily performed by means of the swivel cross-slide, which is an unusual feature of this machine. By swiveling this cross-slide to the desired angle, setting the grinding spindle on the center line of the machine, and reciprocating the table by power, a straight hole can be ground. Then by operating a latched lever on the gear-box to disengage the power reciprocation of the table, the mouth of the hole can be ground concentrically at an angle, without rechucking, by traversing the cross-slide through its hand-wheel. Similarly, by swiveling

the table top slide, a taper hole and a bevel can be ground.

In operation, when the table is reciprocated the work-head moves with it and the grinding wheel remains stationary. This arrangement provides vibrationless support of the grinding spindle and permits the speeds necessary for small-hole work. The base of the work-head is graduated to swivel 90 degrees each side of the center, so that

the head can be set for grinding steeper tapers than is possible with the 5-degree swivel of the table. An individual motor drive provides three selective spindle speeds. The spindle mouth is ground to take Rivett 6 N.S. 1-inch collets and step chucks operated either by a screw draw-in spindle or a lever. Chuck jaws, faceplates, and other fixtures can be mounted on the threaded spindle nose.



Rivett Internal Grinder with Swiveling Work-head and Table Top Slide

The grinding spindle is mounted in a bracket that is carried on the cross-slide and is driven by a two-horsepower motor. Two spindles are available, one for high speed and one for low speed. The cross-slide on which the grinding spindle bracket is mounted is graduated to be set in any position up to 90 degrees right or left of the center. Either hand or power cross-feed can be applied to the cross-slide.

The mechanical reciprocation of the table is slightly retarded as the table approaches the center of its stroke, and is accelerated immediately after the central point is passed. This overcomes the danger of bellmouths

in the grinding of straight holes. Eighteen selective speeds of table reciprocation are obtainable through the gear-box.

The Rivett tip-over diamond fixture is provided for truing the grinding wheel. Once a hole is ground to the desired diameter, the diamond fixture can be set to true the wheel for duplicating the original grind. All moving parts of the machine are fully enclosed and all drive bearings, the reciprocating mechanism, and the table ways are automatically lubricated by the Blanchard Pulsolator system, which consists of a pumping unit and individually adjusted pressure feeders for each bearing.

Landis Hydraulic Piston Grinder

A hydraulically actuated machine designed for grinding automotive pistons slightly under size across the pin holes, so as to provide relief was recently developed by the Landis Tool Co., Waynesboro, Pa. Although this 5-inch Type C machine is largely of new design, it has certain basic features that were incorporated in the original equipment that was built by the

concern for this operation approximately twenty years ago.

The machine operates on the same general principle as the hydraulic cam grinder built by this concern; that is, the work and the work-holding heads are carried by a cradle which is given a swinging motion by a cam in the headstock. The work-cradle is mounted on a swivel table which, in many instances,

is swiveled slightly in order that the pistons may be ground a trifle smaller at the head end than at the skirt end. To insure accurate work, the cam is mounted in large bearings in the head on the same axis as the piston, so that it actually serves as the headstock spindle.

As the work approaches the desired size in the grinding operation, the work traversing speed is slowed down by the operator's manipulating a valve control lever at the front of the bed. This results in a high degree of finish. At the end of the cut, the table traverses far enough from the grinding wheel to permit the piston to be removed without interference.

The amount of stock removed, the relief, and the taper (when taper is required) vary with different pistons. On a typical piston, a total of 0.015 inch of stock is removed. Approximately 0.014 inch of stock is ground off during the fast traverse of the work-table, and 0.001 inch during the slower speed. The relief is 0.004 inch on a side.

Although this machine was designed primarily for relieving pistons as described, it can also be used for grinding them round.

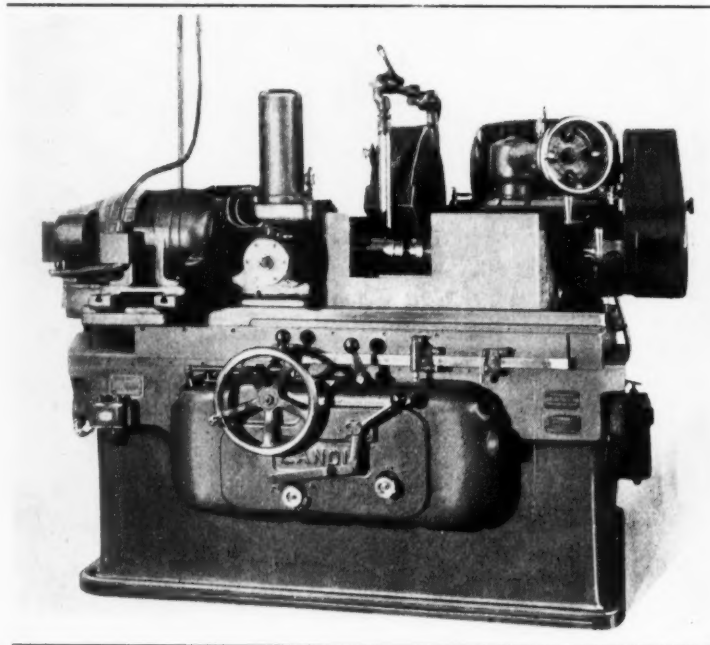


Fig. 1. Landis Machine for Grinding Pistons Under Size across the Pin Holes

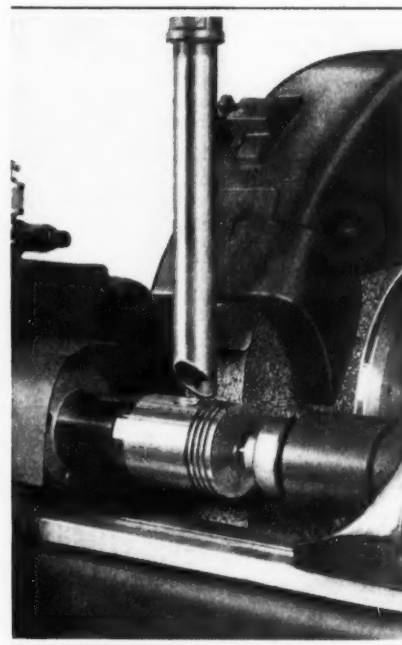


Fig. 2. Method of Holding a Piston for Relieving

SHOP EQUIPMENT SECTION

Brown & Sharpe Small-Size Plain Grinding Machines

Work up to 3 inches in diameter by 12 or 18 inches in length can be accommodated by two sizes of a No. 5 plain grinding machine recently announced by the Brown & Sharpe Mfg. Co., Providence, R. I., when these machines are equipped with 14-inch grinding wheels. The actual swing over the table of work held between centers is 3 31/32 inches.

These small-size machines were developed particularly for the cylindrical grinding of duplicate small parts to close limits on a production basis. For efficient production grinding, the maximum work diameter recommended by the manufacturer is about 1 inch. The shorter-table machine is intended for applications where the work is not over 12 inches long and minimum floor space is an important requirement.

As will be seen from the illustration, the base of these machines is of a recessed design, which provides ample leg room for the operator, so that he can sit comfortably at the front of the machine. The height of the

table and controls also provides for convenient operation from a standing position. All operating controls and adjustment means are grouped at the front of the machine.

The headstock and coolant pump are started and stopped electrically as the cross-feed handwheel is rotated. They start automatically when the grinding wheel is advanced toward the work, and stop when the wheel is withdrawn to the unloading position. This feature, in combination with a headstock brake, is advantageous in maintaining high-production schedules. An additional aid to rapid production is afforded by the table tray, which provides a handy place on which to lay work-pieces, dogs, and tools. A lever permits of

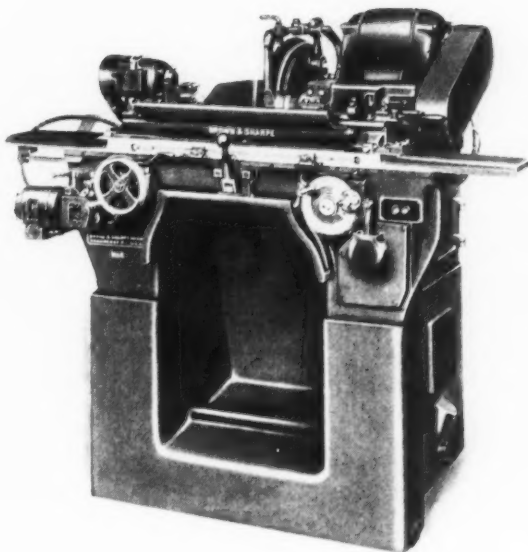
stopping the drive of the headstock and coolant-pump motors when truing the grinding wheel or setting up the machine.

The wheel-spindle, headstock, table, and coolant pump are driven by separate motors, all of which are controlled by a push-button station at the front of the machine. All electrical control units are built into the machine, where they are well protected and yet easily accessible. An automatic oiling system lubricates the wheel-spindle bearings, the cross-feed screw and full nut, the table and cross-slide ways, and the table driving mechanism. The coolant tank is integral with the bed casting, and has removable cover and baffle plates. The centrifugal Motorpump is also removable, to facilitate cleaning of the coolant tank. V-belts drive the headstock and wheel spindle.

Torrington Spring-Making Machines

A line of high-speed machinery for the manufacture of springs on a production basis is now being introduced to the trade by the Torrington Mfg. Co., Torrington, Conn. The line

includes segment and clutch type coilers in eight sizes that handle wire from 0.006 to 3/8 inch diameter, as well as torsion spring machines in four sizes for wire from 0.006 to 1/4 inch diameter.



Brown & Sharpe Plain Grinding Machine with Recessed Base for Operator Comfort



One of a Line of Spring-making Machines Recently Designed by the Torrington Mfg. Co.

SHOP EQUIPMENT SECTION

Tooling for any requirements within the ranges of these machines can be supplied, as well as attachments for making long coils, square or odd-shaped wire coiling rings, etc.

Features of the new machines include simple feed adjustment; safety handwheel; fully enclosed and compact design with built-in

motor; Timken roller bearings; convenient controls for pitch diameter, cut-off, etc.; and variable production speeds, either by means of change-gears or a standard variable-speed unit. The wire feed on the clutch type machines is adjustable through either fixed-center change-gears or a sliding-gear box.

can be supplied. The wheel-head swivels 30 degrees in either direction, the motor being mounted on a vibration-absorbing base which swivels with the head.

The table is actuated longitudinally through a spiral gear and rack. The gear is mounted on a ball and roller bearing. The machine can be equipped with a dust collecting unit, centers, and a vise.

Some of the important specifications are as follows: Longitudinal travel of table, 18 inches; vertical movement of table, 11 inches; transverse movement of table, 7 1/2 inches; working surface of table, 6 by 28 3/4 inches; and minimum and maximum distances from center of grinding wheel to table, 6 1/2 and 17 1/2 inches, respectively.

Covel Swivel-Head Surface Grinder

A No. 72-A surface grinder having a swiveling head and table that adapt the machine for grinding all kinds of milling cutters (including spiral), counterbores, special tools, and irregular surfaces is a recent development of the Covel Mfg. Co., Benton Harbor, Mich. Centers or fixtures can be mounted on the swivel table, which is graduated at one end in degrees and on the other end to indicate taper in inches per foot. The table swings 45 degrees each way. Lip rests for indexing can be fastened to either the head or the table. Work up to 12 1/8 inches in diameter by 14 1/2 inches long can be swung between centers mounted on the table.

The grinding wheel is mounted on a heavy spindle that runs in ball bearings without end play, and is driven through a V-belt

by a 1 1/2-horsepower motor. Three wheel speeds are available—1900, 2400, and 2900 revolutions per minute, the motor speed being 1750 revolutions per minute. The standard grinding wheel is 10 inches in diameter by 3/4 inch thick, but special wheels up to 2 1/4 inches thick

Federal Foot and Automatically Operated Spot-Welders

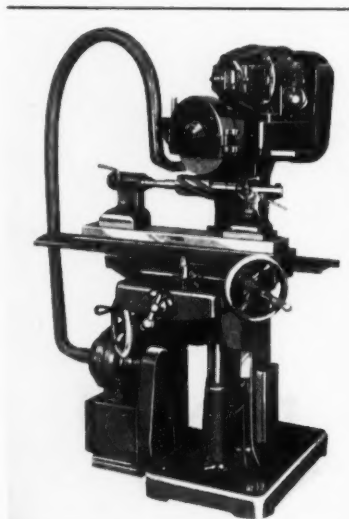
A new line of foot and automatically operated spot-welders, known as the Type R series, has been designed by the Federal Machine & Welder Co., 212 Dana St., Warren, Ohio. The line includes eight machines from 7 1/2 to 60 kilovolt-amperes in capacity. The horn diameters vary from 1 3/4 inches on the smallest machine up to 2 3/4 inches on the largest machine. Throat depths range from 6 to 48 inches. The water-cooled electrodes are from 7/8 inch to 1 1/4 inches in diameter. The welding tips can be tapered or threaded.

The illustration shows a machine of the automatic type. The drive unit consists of a worm-gear reduction and a Reeves variable-speed unit driven by a fractional horsepower motor which gives a three-to-one speed variation. Operating speeds may be from 30 to 90 strokes a minute or from 72 to 216 strokes a minute on the same welder, depending upon whether it is equipped with a single, double, triple, or quadruple worm-gear reduction and also depending upon the reduction ratio.

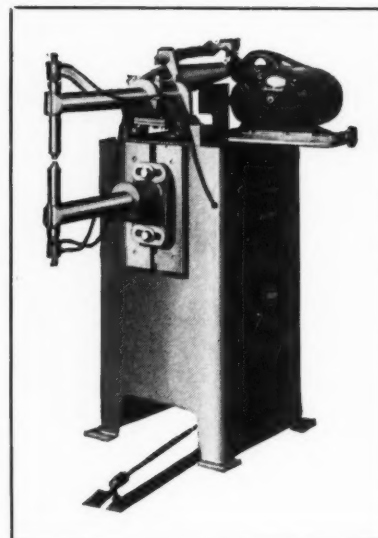
The lower horn socket has an adjustment of 6 inches with the horn socket as shown, or an ad-

justment of 8 inches with the horn socket turned upside down. However, an adjustment of 28 or 30 inches can be provided. The welder transformer has eight points of regulation for varying the voltage and current.

One housing or frame is used for the four smaller machines of the line and another for the four larger machines.



Covel Surface Grinder with Swiveling Wheel-head and Table



Federal Automatic Spot-welder of Recent Design

SHOP EQUIPMENT SECTION



Fig. 1. "Metalmaster" Contour Sawing and Filing Machine



Fig. 2. Job Selector Dial, Speed Indicator, and Automatic Welder

Doall "Metalmaster" Contour Machine

The Doall line of contour sawing and filing equipment, built by the Continental Machine Specialties, Inc., 1301 S. Washington Ave., Minneapolis, Minn., has recently been redesigned to provide for wider application in the machining of metal and other materials. Five major improvements have been incorporated in the construction of the latest model, which has been termed the "Metalmaster." First, the speed range has been increased to from 50 to 800 cutting feet per minute, inclusive, through the adoption of a V-belt transmission with interlocking variable-pitch double-groove pulleys. This transmission gives a speed ratio of more than 16 to 1. The increased speed range enables the most efficient speed to be used for a wide variety of materials.

Closer control of speeds is provided by the job selector dial seen in Fig. 2 (described in April MACHINERY, page 567), and by a standard make of tachometer, connected to the transmission mechanism, which indicates the saw speed in feet per minute.

To permit quicker joining of saw bands, a fully automatic

resistance type butt-welder is now mounted on the left-hand side of the column, as also illustrated in Fig. 2. This equipment is provided with a momentary contact switch which closes the circuit until the weld is made. The circuit is then broken by a toggle-mounted mercury switch. The work-table is mounted on a two-way trunnion type mechanism which allows it to be tilted 45 degrees forward, 10 degrees backward, and 10 degrees laterally, in either direction. With this arrangement, any desired table plane can be obtained in relation to the saw or file within the range mentioned.

A controlled flexible work feed has been obtained by the application of a weight in such a manner that the optimum cutting speeds can be obtained for the material being machined. The work can be turned freely without changing the force exerted or the angle of tension.

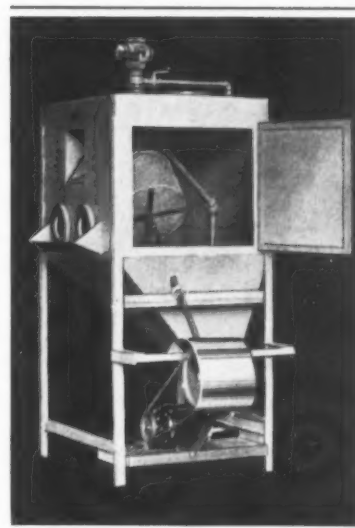
"Metalmaster" models are built in two sizes, on one of which the distance from the center line of cutting to the column is 14 inches. This size accommodates most tool-room and production work. The second size has a throat of 30 inches.

Leiman Automatic Continuous-Feed Sand-Blast Equipment

Automatic sand-blasting equipment of a cabinet type, in which there is a motor-driven basket for handling large quantities of small parts, is being placed on the market by Leiman Bros., Inc., 23F Walker St., New York City. This revolving basket eliminates the need of holding the work-pieces by hand and sand-blasting them singly.

For filling, the basket is lifted from its shaft and removed from the cabinet. After being loaded with work, it is simply replaced on the shaft. The use of two baskets, so that one can be filled while the other is in use, gives maximum output. The basket is revolved at a slow speed from ten to twenty minutes, during which time the parts are so tumbled that all surfaces are presented toward the sand blast. The basket is made of strong wire mesh, reinforced by a welded steel framework. Because it is not subjected to the direct force of the sand blast, it will last indefinitely.

This sand-blast equipment can also be employed for sand-blasting large work while held by hand. For operations of this sort, the basket is removed, so as to make available the full di-



Sand-blast Equipment Designed for Large and Small Work

SHOP EQUIPMENT SECTION

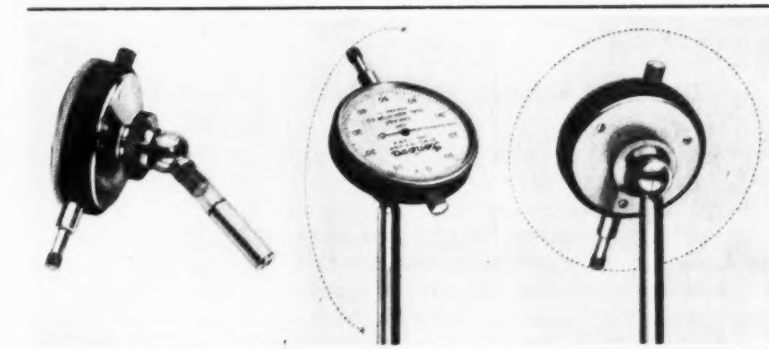
mensions of the cabinet interior. The cabinet, in the four sizes of equipment available, has the following dimensions: 60 inches long by 24 inches wide; 36 inches long by 30 inches wide; 24 inches long by 18 inches wide; and 16 inches long by 12 inches wide.

The small motor that is required for driving the revolving basket is equipped with a worm-gear speed reducer. An electric light within the cabinet facilitates the observation of sand-blasting operations. The observation glass is protected from the blast of sand.

Universal Holder for Dial Indicators

A universal holder of ball-joint construction that permits dial indicators to be held in an unusually wide range of settings has been brought out by the Chicago Dial Indicator Co., 180 N. Wacker Drive, Chicago, Ill. This Geneva holder is intended for use with different makes of indicators, and not only with the Geneva indicator described in July MACHINERY, page 759.

An indicator mounted on this holder can be turned through 180 degrees on the inner section of the ball joint—that is, about the axis of the pin that extends



Geneva Universal Holder for Dial Indicators of Various Makes

through the center of the joint, as indicated in the central view of the illustration. The indicator can also be turned through 360 degrees, or a complete circle, while set in any position on the 180-degree arc, as shown in the right-hand view.

The universal movement is obtained by turning the knurled thumb-nut which permits of set-

ting the indicator point instantly. Tightening this thumb-nut compresses a cupped fiber washer against the ball joint and clamps the indicator in the desired position. The ball joint has a short 1/4-inch diameter shank with twenty-eight threads per inch, to which long shanks of round, square, or other cross-section can be conveniently attached.

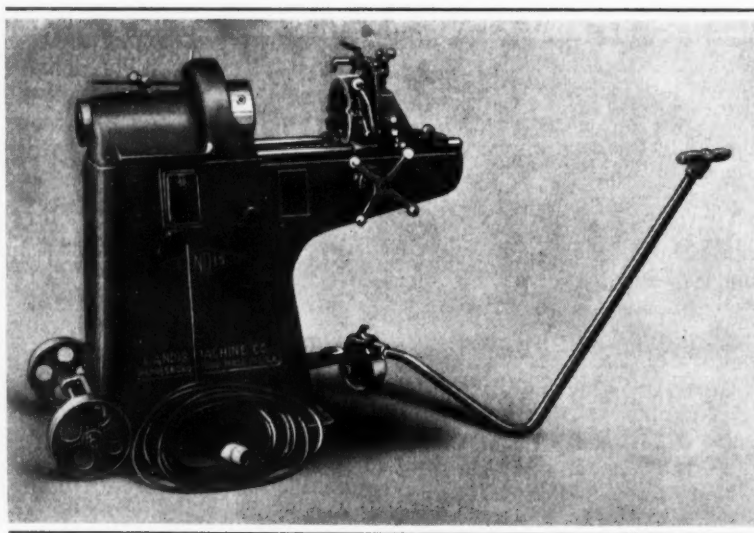
Portable "Little Landis" Pipe Threading and Cutting Machine

The Landis Machine Co., Inc., Waynesboro, Pa., has designed a new mounting for the "Little Landis" 2-inch pipe threading and cutting machine, so as to facilitate moving the machine from one location to another. As

shown in the illustration, two wheels are provided at the rear of the bed, while a single guide wheel that is integral with the handle, is used at the front end. The guide wheel and handle are detachable from the bed in order to avoid interference in operation. Removal of the handle and wheel automatically lowers the machine to the floor, so that it rests solidly on its own base when in actual use.

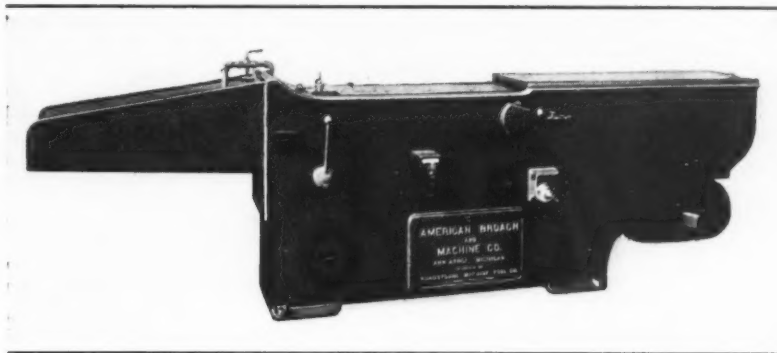
In attaching the handle again, in order to move the machine to another location, the operator hooks the handle to the swivel bracket at the front of the bed. Then by pushing down on the handle, the machine is raised approximately 2 inches from the floor, so that it can be readily transported.

In other respects, the machine is of the same general design as the one described in September, 1934, MACHINERY, page 51. Pipe from 1/4 inch to 2 inches, inclusive, or bolts up to 1 1/2 inches diameter can be threaded with this equipment.



Portable Arrangement of "Little Landis" 2-inch Pipe Threading and Cutting Machine

SHOP EQUIPMENT SECTION



Horizontal Hydraulic Broaching Machine Built in Five Sizes by the American Broach & Machine Co.

American Horizontal Hydraulic Broaching Machines

Five sizes of a Type H horizontal hydraulic broaching machine have been developed by the American Broach & Machine Co., Ann Arbor, Mich., for the performance of any internal broaching operation and a variety of surface broaching operations. While these machines are intended for the continuous production of duplicate parts, they can be easily set up for short runs on different types of work by substituting suitable broaches, guide bushings, and broach pullers. A workholding fixture that incorporates broach guides is required for surface broaching operations.

Infinite variation of the cutting speed between maximum and minimum is provided by a lever and a graduated dial which are located on the front of the base. Another lever at the left of the bed gives the operator a sensitive control of the broach slide movement. A safety detent holds this lever in a vertical neutral position. Movement of the lever to either side of vertical results in a slide movement in the same direction. The lever permits "inching" in either direction during set-ups of the machine. Adjustable collars stop the slide at the end of the stroke. The pulling head on the slide can be adjusted vertically to insure an accurate straight-line pull. The pulling slide is of extra length to promote smooth cutting, continuous alignment, and long life.

A motor with a standard frame is directly connected to the hydraulic unit by means of a flexible coupling. This motor is mounted off the floor at the right-hand end of the machine, as seen in the illustration, where it is out of the way, well ventilated, and readily accessible. The pumping unit is continuously submerged in the hydraulic-system oil that is contained in a sealed dirt-proof reservoir in the bed. A fan type pressure gage protected by a stop-cock enables the operator to check conveniently the pressure in the hydraulic system. The hydraulic cylinder is secured solidly to the bed under the pulling slide so as to conserve floor space. The piston-head and stuffing box are of a special construction designed to insure smooth leak-proof operation.

Hardened steel ways are provided for the pulling slide. An automatic pressure lubricator operates with each stroke of the slide to draw oil from a reservoir and force it to the ways. Coolant is supplied to the work and broach by a centrifugal pump equipped with a direct-connected motor drive. A heavy steel guard confines chips and coolant and also protects the work and broach. A chip chute that extends through the front of the bed conducts chips and coolant to an interior compartment, from which the chips fall into a receptacle while the coolant drains back into a reservoir. The

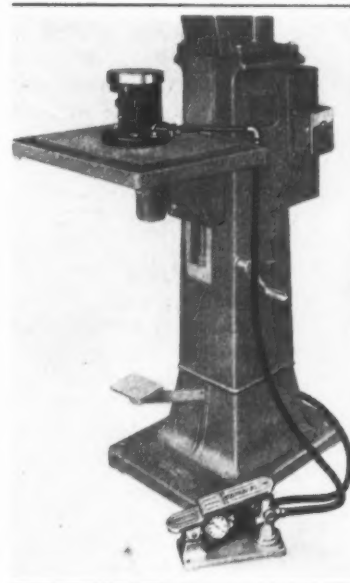
chips can be removed conveniently from the rear of the machine without interfering with production.

These machines range from 6 to 20 tons in normal capacity and from 9 to 28 tons in maximum capacity. On the smallest machine, the stroke is 36 inches and the maximum broach length is 44 inches, while on the largest machine the stroke is 60 inches and the maximum broach length is 69 inches. The cutting speed on the smallest machine ranges from 10 to 28 feet per minute while the return speed is 44 feet per minute. On the largest machine the cutting speed ranges from 17 to 25 feet per minute and the return speed is 40 feet per minute.

Haskins Air-Operated Jig

A cylinder for operating the foot-pedal of high-speed tapping machines built by the R. G. Haskins Co., 4634 W. Fulton St., Chicago, Ill., by means of compressed air, was described in December, 1936, *MACHINERY*, page 293. The tap head of these machines moves up and down, the work being held stationary on the table.

To further increase the sensi-



Air-operated Jig for Tapping and Other Operations

tivity of air-controlled tapping, the concern has now designed an air jig which is mounted on the table, as illustrated. On machines thus equipped, the tap head remains in a fixed position and the work blanks are brought to the tap, as an air-operated piston moves the jig table upward. The movement of the jig table is governed by a foot-pedal control-valve assembly, consisting of a foot-pedal and base, a plunger valve, a pressure regulator, and a pressure gage.

As with the air cylinder for operating the foot-pedal, the operator does not have to gage the pressure applied to the tap. The device not only maintains a uniform pressure throughout the stroke, but also controls the rate of feeding and reversing the tap. The pneumatic control can be accurately regulated to meet the requirements of each job.

This development promotes accuracy in high-speed tapping

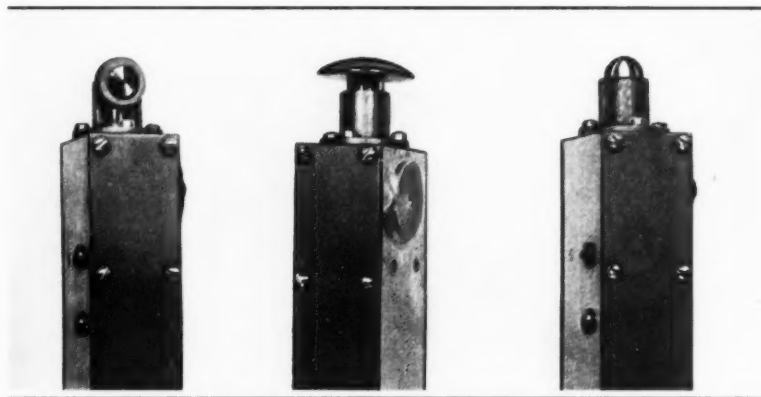


Fig. 2. Roller, Push-button, and Plunger Type Switches Made by the National Acme Co.

and results in longer tap life. The jig is also applicable for operations other than tapping, such as countersinking, counter-boring, spot-facing, and reaming. When the depth of cut must be held within close limits, the air control insures uniformity of operations.

extremely light touch must make or break the circuit. This switch may be actuated by applying a pressure of only one ounce to a 9-inch lever. The rotary switch is particularly adaptable in applications where revolution contacts, linear measurement wheels, star wheels, etc., are used.

The oscillating type switch makes contact in one direction only and has many applications in the machine tool field. The plunger and push-button switches require less than 1/16 inch of movement to effect a contact and allow an additional 3/16 inch movement for over-travel. These types may be used as limit, safety, or cam-operated switches.

The internal operating levers in all models are equipped with an adjustable steel spring, which insures a correct pressure on the contact button. Actual electrical contacts are made in a fully-enclosed dustproof, removable switch, which is a product of the Micro Switch Corporation. Its general design is such as required for the making of rapid contacts and continuous operation. It is provided with a spring that is made of beryllium copper and heat-treated to give maximum pressure life. Various types of these switches have been successfully operated at speeds of more than 200 contacts a minute.

The standard mounting of these switches is made with two screws that enter tapped holes in the bottom of the housing. Other mountings can be made by applying special bottom plates.

Namco Super-Sensitive Line-Voltage Switch

In the manufacture of Chronologs and electrical recording counters, the National Acme Co., 123 E. 131st St., Cleveland, Ohio, designed a super-sensitive switch which is claimed to have an unusually long life. This switch is now being placed on the market for other applications. For instance, it may be used as a limit switch, safety switch, or in connection with counting devices, circuit breakers, liquid level con-

trols, gaging devices, relays, pressure controls, governors, and other devices.

The switch is made in the light-contact, rotary, and oscillating types illustrated at the left, center and right, respectively, in Fig. 1, and in the roller, push-button, and plunger types shown at the left, center and right, respectively, in Fig. 2. The light-contact switch is intended for application where an

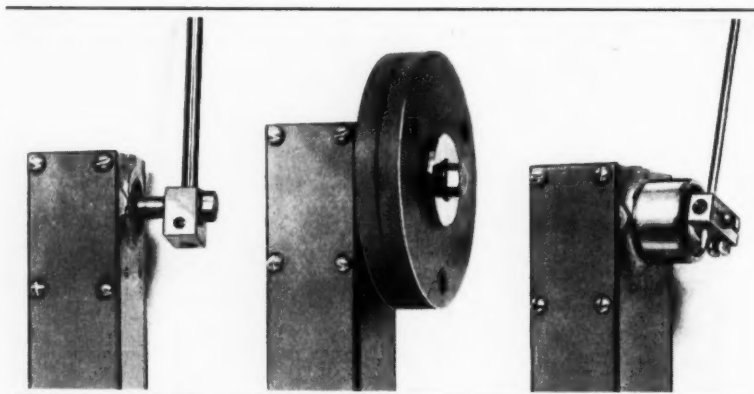


Fig. 1. Super-sensitive Line-voltage Switches of Light-contact, Rotary, and Oscillating Types

SHOP EQUIPMENT SECTION

Eisler Air-Operated Spot-Welder

Welds made with an air-operated spot-welder recently brought out by the Eisler Engineering Co., Inc., 740-770 S. 13th St., Newark, N. J., are controlled by means of a solenoid starter. When the starter button is depressed, the solenoid actuates an air cylinder, which, in turn, closes the electrodes on the work. A valve is used to regulate the air pressure from 35 to 60 pounds per square inch, depending upon the nature of the work.

The duration of the welding

to 100 spot-welds a minute. There is an eight-point hand-wheel for heat regulation, and the transformer is air-cooled.

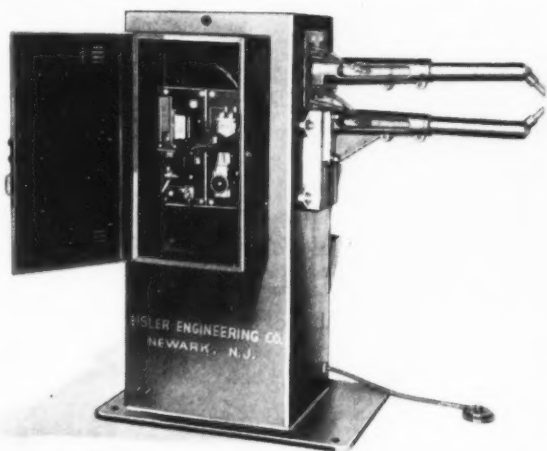
"Ideal" Commutator Turning Tool-Head

A turning tool-head intended for use in conjunction with the grinders made by the Ideal Commutator Dresser Co., 1011 Park Ave., Sycamore, Ill., for resurfacing commutators, is being in-

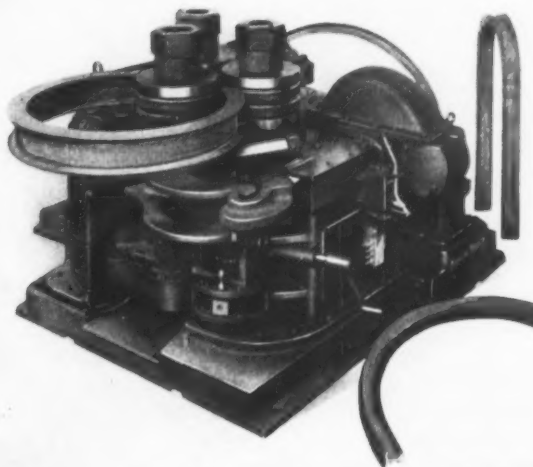
lowed to coast until a safe cutting speed is reached and then the cutting operation performed. The turning tool-head includes a tool bit of high-speed steel, tool-holder, toolpost, cast-iron base, and toolpost wrench.

Kane & Roach Horizontal Angle-Bending Machine

Angle-irons up to 5- by 5- by 1/2-inch can be bent with the leg out, and up to 4 1/2- by 4 1/2- by 1/2-inch with the leg in, on a No. 23 horizontal bending roll



Spot-welder with a Solenoid Starter that Controls the Air-operated Electrodes



Kane & Roach Machine for Bending Angle-irons and Other Structural Shapes

period is controlled by an automatic timer and contactor, assembled on the side of the frame. The timer is adjustable to control current from 2 to 60 cycles, in 110 divisions.

Variation in the type of work is provided for by interchanging arms. Also, the lower arm can be raised or lowered to correspond with the depth of work. The arm supports permit the use of arms ranging in length from 36 to 48 inches. The arms can be slid in and out of the supports to suit the particular work being handled.

Cooling water is circulated through the arms, electrode-holders, and electrodes, close to the ends of the electrodes. The welder is capable of making up

produced on the market by the same concern. For example, in applying these grinders on some types of commutators, it is difficult to remove the bead or ridge of copper that is left on the inside of the commutator next to the risers. The turning tool can be readily applied for removing this bead.

This turning tool-head may be used with either the "Perfect" or "Ideal" precision grinders, being interchangeable with the top part or cross-slide of the grinding head. In using this turning tool, the commutator must be turned slowly. It may be done by using an auxiliary motor and a gear or belt reduction. However, with large equipment, the armature may be al-

recently brought out by Kane & Roach, Inc., Syracuse, N. Y. Other structural shapes can be handled in proportionate sizes, including I-beams; rails; channel irons; flat, square, hexagonal, octagonal, and round bars; pipe; and tubing.

The front roll of this machine can be adjusted in and out for regulating the pressure, so as to change the diameter of the circles to which the structural shapes are bent. Generally, this adjustment is accomplished by manual operation of the adjusting screw, but the machine can be furnished as illustrated with a power drive for this adjustment. The bent work can be easily removed by swinging open the "pressure adjustable" roll-shaft.

SHOP EQUIPMENT SECTION



V-belt Fasteners Brought out by the Flexible Steel Lacing Co.

Alligator V-Belt Fasteners

A fastener of new design for joining C-section V-belts of fabric core, cross-weave construction is being introduced on the market by the Flexible Steel Lacing Co., 4640 Lexington St., Chicago, Ill. This fastener permits the installation, shortening, or replacement of V-belts on the job without expensive delay. Unusual features include a double rocker pin, supported in bronze bushings, as seen in the illustration, and a method of holding the end plate to the belt end without materially weakening the belt or bulging its sides.

The rocker pin is made of alloy steel and is hardened for long service. Metal does not touch the pulleys. This V-belt fastener has been used for several years by railroads for driving the air-conditioning equipment of passenger cars and axle-driven lighting apparatus. It is now being supplied for general industrial application.

Soluble Cutting Oil for High-Speed Machine Tools

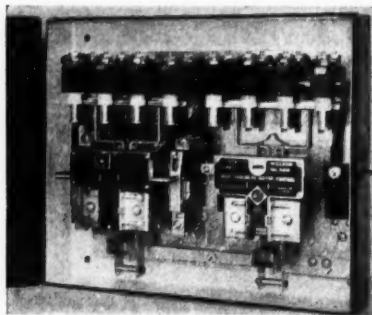
A soluble cutting oil intended specifically for use with high-speed machine tools operating under heavy feeds has been developed by the Industrial Division of the National Oil Products Co., Harrison, N. J. This oil, which is known as "Nopco 1227-B," is suitable for use in turning, grinding, milling, drilling, light broaching, and other metal-working operations.

The new oil is a combination

of mineral and fatty oils treated in such a way as to be immediately soluble in either cold or warm water. The fatty oil content is said to be unusually high, which increases the film strength and provides the lubricating and cooling values essential in high-speed machinery, which develops a great deal of heat in operation.

Allis-Chalmers Reversing Motor-Starter

The Allis-Chalmers Mfg. Co., Condit Works, Boston, Mass., has brought out a reversing motor-starter designated as Type AP-7-R, which has a capacity of



Reversing Motor-starter Equipped with Ruptors

7 1/2 horsepower on current of 550 volts or less. This starter consists of two Type AP-7 motor-starter units, described in June MACHINERY, page 697, the two units being mechanically interlocked so that they cannot both be closed at the same time.

These starter units are equipped with Ruptors, which consist of enclosing chambers that confine and depotentiate the arc formed by circuit interruption. They increase the interrupting ability of the contacts and form individual isolating barriers between contacts that are of opposite polarity.

Other features of the starter include large silver double break contacts; a solenoid-operated vertical make-and-break arrangement that provides for silent operation; pole units that consist of individual molded bases mounted on a steel chassis so as

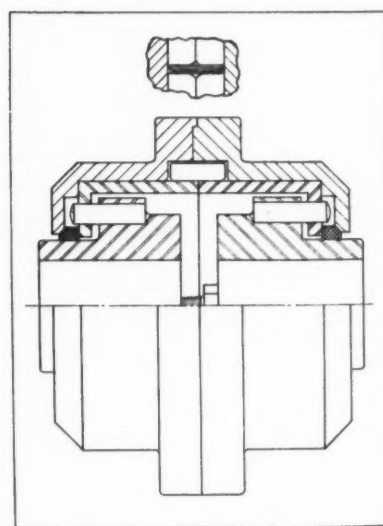
to provide true contact alignment; and enclosed temperature overload relays that afford positive motor protection.

Rybeck Flexible Coupling

The T. L. Smith Co., 2805 N. 32nd St., Milwaukee, Wis., is introducing on the market the Rybeck flexible coupling here illustrated, which is designed to compensate for extreme conditions of shaft misalignment, offset between shafts, end play, and shock without an increase in the bearing loads. While this coupling is similar in external appearance to one previously described in MACHINERY, the internal construction differs entirely.

From the sectional drawing here shown it will be seen that the two sleeve members of the coupling have a continuous flange around the outside in which slots are cut to receive laminated springs. The hubs are provided with drive pins that are positioned horizontally so as to engage in holes in the apron on the sleeve ends.

Torsional load is transmitted through the groups of laminated springs which are made of heat-treated Swedish spring steel. These springs are not subjected



Construction Details of the Rybeck Flexible Coupling

SHOP EQUIPMENT SECTION

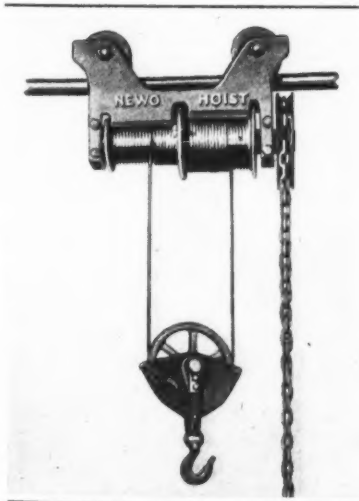
to any wear from end-wise motion of the shafts or from angular or offset misalignment, since they are confined in a housing that eliminates any motion except deflection. The springs are stressed to only a minimum of their load carrying capacity.

The driving pins are made of alloy steel and heat-treated. The sleeves are also hardened and are held in alignment by the housing which is bolted together. The housing also holds the springs in position between the jaws on the sleeves.

Newo Gearless Hoist

The Newo Hoist Co., 17,309 Fernway Road, Cleveland, Ohio, has brought out a hoist of simple design for handling loads not exceeding 2000 pounds that need to be moved short distances only, as in transferring work to tramways, traveling cranes, or conveyors. A lifting ratio of approximately 15 to 1 is obtained by winding a cable on a large drum as a smaller drum unwinds. Hand power is applied by means of a sprocket and endless chain.

A latch acts as a ratchet in raising the load, and permits the



Newo Gearless Hoist of 2000 Pounds Capacity



Lathe or Grinder Center with a Carboloy Tip

load to be suspended at any desired height. This latch is disengaged in lowering the load, but it instantly stops downward movement upon being released. The hoist trolley wheels are grooved to suit 1 1/2- to 4-inch double-strength pipe or I-beams. Special hoists can be supplied.

Rubber-Tired Conveyor Wheels

Wheels of pressed steel construction that are provided with rubber tires and ball bearings have been brought out in two sizes by the Mathews Conveyor Co., Ellwood City, Pa. These wheels are intended primarily for use in conveyor installations intended for handling steel sheets, glass, or other work that must be protected from scratches or jarring. They can be mounted in light frame sections that are available both straight and curved.

The wheels are, however, also suitable for use as casters on small hand trucks, portable cabinets, etc. They are made to outside diameters of 2 7/8 and 3 1/2 inches, the small size having a rated capacity of 20 pounds and the larger size, 50 pounds.

The Mathews Conveyor Co. has also recently added a Type 47-SB ball-bearing conveyor roller to its standard line, which is similar in construction to those illustrated in March, 1937, *MACHINERY*, page 491. However, the seamless steel tube of the new roller has an outside diameter of 3 1/2 inches. It has a rated capacity of 2200 pounds and can be furnished in lengths from 6 to 48 inches.

Carboloy-Tipped Centers

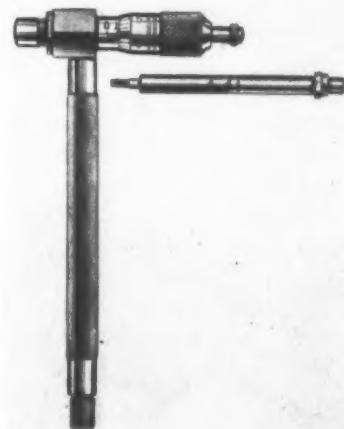
Lathe and grinder centers with a Carboloy cone-shaped tip in place of the ordinary steel tip are being placed on the market by the Carboloy Company, Inc., 2987 E. Jefferson Ave., Detroit, Mich. These centers have been

found to wear about fifty times longer than ordinary steel centers. In one instance, in a turning operation on SAE-2335 steel shafting, Carboloy centers lasted three years with one regrinding, whereas ordinary centers, formerly used on the same job, lasted one week only.

The diamond-like hardness of the cemented-carbide tip makes these centers particularly suitable for work that has been nitrided, casehardened, or otherwise heat-treated. Burning and scoring are eliminated with these centers. They are available in all sizes, finished ready for use.

Brown & Sharpe Telescoping Inside Micrometer

The advantages of a telescoping gage and inside micrometer are combined in a telescoping inside micrometer (No. 268),



Brown & Sharpe Telescoping Inside Micrometer

which has been added to the products of the Brown & Sharpe Mfg. Co., Providence, R. I. When this measuring device is inserted in a hole or recess, the telescoping measuring point adjusts itself to the work surfaces. The setting is then locked by turning a knob at the end of the handle, after which the instrument is withdrawn from the work.

The micrometer thimble is next turned until it makes contact with the shoulder of the

measuring rod, after which a measurement in thousandths of an inch can be read directly from the micrometer graduations. The length of the measuring rod being used is then added to the micrometer reading to determine the dimension of the hole or recess being checked.

This instrument has a range of from 2 to 6 inches. Provision is made for adjusting the measuring points to compensate for wear.

Flow Meters for Use in Gas Furnace Operation

Flow meters for measuring the flow of air and gas in order to control gas-burning operations are being placed on the market by the American Gas Furnace Co., Elizabeth, N. J. When used for regulating the flow of gas to a retort or muffle furnace, as in gas carburizing, these flow meters insure good carburizing without excessive

consumption of gas or excess deposit of carbon in the retort and on the work. Two flow meters can be used with similar advantages to control the flow of gas to full muffle furnaces, etc., in clean hardening, bright annealing, and similar operations.

Two or more flow meters may be used to proportion the flow of several gases to a muffle or retort when a mixture of gases is employed for heat-treating or for the processing of materials under specific atmospheric conditions. The flow meters permit duplication of settings at any time for obtaining a predetermined rate of temperature rise in the operation of a furnace, or for holding the furnace at a given temperature as determined from previous operations. They enable duplication of conditions from hour to hour and day to day. The flow of gases can be determined at a glance because of the direct reading feature.



Flow Meter for Controlling Air and Gas Supplied to Furnaces

Pneumatic Die Cushion for Inclinable Presses

The Dayton Rogers Mfg. Co., Minneapolis, Minn., has brought out the Model A pneumatic die cushion here shown, which is especially designed for use on inclinable presses. This cushion is made in seven sizes having drawing capacities from 2 1/2 to 5 inches. The new design is provided with a handwheel and handwheel stop for accurately adjusting the piston pressure



Pneumatic Die Cushion for Inclinable Presses

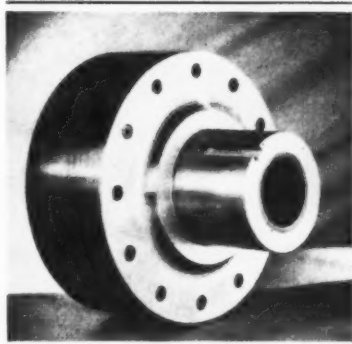
plate to predetermined heights to suit various operations.

This cushion can be used for all drawing and forming die actions, as well as to control stripping actions on compound blanking and piercing dies. It may be employed for replacing springs and rubber on dies already in use.

These die cushions operate on an air-line pressure of from 20 to 150 pounds per square inch and develop a draw-ring holding pressure of from 1/4 ton to 8 tons. The pressure may be controlled by means of the regulator and recorded on the gage. Each cushion is a self-contained portable unit that is connected direct to the air line.

Hilliard Over-Running Clutch of Improved Design

An over-running clutch of improved design being placed on the market by the Hilliard Corporation, 102 W. Fourth St., Elmira, N. Y., embodies the basic principle of previous clutches made by the concern, which involves the use of rollers that run between a circular outer race that forms one member of the clutch and flat surfaces on an inner hub which form the other clutch member. However, whereas the rollers were formerly retained in a cage equipped with from one to three springs for controlling the action of all the rollers, the new clutch is con-



Hilliard Over-running Clutch of Improved Design

structured with individual springs for each roller. This reduces backlash to a negligible point and provides smooth and instantaneous engagement.

In the earlier clutch design the hubs differed on the two ends. In order to reverse the direction of rotation in the field, it was necessary to take the entire mechanism apart and reassemble the cage and rollers. In the new design, the hubs are symmetrical on the two ends. To reverse operation in the field, it is only necessary to remove the cover, take out as a unit the hub on which the roller mechanism is assembled, turn it end-for-end, and replace.

Another feature of the new design is that any standard clutch may be equipped with double the number of rollers when unusual conditions call for high torque capacity and only limited space is available for the clutch. Standard clutches are equipped with sleeves for convenience in mounting pulleys, gears, or sprockets.

Census of Machine Tool Accessories

According to statistics published by the Bureau of the Census, Washington, D. C., covering the industries manufacturing machine tool accessories and small tools in 1935, these industries employed 23,135 wage earners in that year, as compared with 12,757 in 1933. The total wages paid in these industries increased from approximately \$14,160,000 to \$34,414,000 in the same period.

The total value of machine tool accessories, small tools, and machinists' precision tools made in 1935 amounted, in round numbers, to \$105,000,000, as compared with \$46,880,000 in 1933.

Attachments and fixtures accounted for approximately \$58,500,000 in 1935, and small cutting tools and tool-holders close to \$40,000,000.

The industries making machine tool accessories and machinists' precision tools, as defined for census purposes, embrace plants whose chief products are attachments, accessories, and tools for machine tools, such as chucks, vises, dies, jigs, fixtures, milling cutters, taps, drills, reamers, counterbores, and special tools. The classification also includes micrometers, verniers, gages, and similar precision measuring tools.

The values of some of the important sub-divisions, in round numbers, manufactured in 1935, are as follows:

Milling cutters, separately reported	\$7,050,000
Drills, separately reported	8,981,000
Reamers, separately reported	3,184,000
Milling cutters, drills, and reamers, not reported separately	1,112,000
Taps (not pipe threading)	3,806,000
Dies (not pipe threading)	1,513,000
Chasers (not pipe threading)	1,790,000
Pipe threading taps	424,000
Pipe threading dies	475,000
Pipe threading chasers	134,000
Pipe stocks complete with dies	1,305,000
Hobs, milling	2,231,000
Counterbores	507,000
Countersinks and combination countersinks and drills	356,000
Lathe, planer, and shaper tools, not including tool-holders	443,000
Jigs and fixtures	6,320,000
Punches, dies, die sets, leader pins, bushings, etc.	21,840,000
Tools for screw and automatic machines	1,571,000
Specially designed tools for various types of machine tools	5,428,000
Chucks and vises	2,035,000
Precision measuring tools, gages, etc.	4,090,000

Removing Broken Studs by the Aid of Welding

An old idea, but new to many and finding frequent use, is the easy removal of bolts and studs that have broken off flush with the surface or below the surface of the metal into which they have been screwed. Weld a flat stem on the old stub so that a

wrench can be applied. During the welding process, the stub of the old bolt expands against the surrounding metal and when it cools, it becomes slightly smaller than it was before heating. This action, together with the ease of applying the wrench by means of the welded-on stub, makes it fairly easy to remove broken off bolts. This method has been

successfully used for stove bolts down to 3/16 inch in diameter.

—Oxy-Acetylene Tips

* * *

The railroads last year expended over \$37,000,000 for steel rails, the largest amount since 1931—another evidence of increased railroad activity.

NEWS OF THE INDUSTRY

Connecticut and Massachusetts

DWIGHT G. PHELPS, formerly manager of the electrical division of the Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., has been promoted to the position of vice-president in charge of the electrical division. Mr. Phelps has been associated with the company since 1902, when he started work as an office boy. Other promotions announced are as follows: F. T. MOORE, vice-president, to first vice-president; H. D. FAIRWEATHER, treasurer, to vice-president and treasurer; and B. F. CONNER, manager of the plastics division, to vice-president in charge of the plastics division.

I. L. BURRITT has joined the sales force of L. Heres De Wyk & Son, 133 S. Cliff St., Ansonia, Conn., consulting engineers and manufacturers' agents. Mr. Burritt will cover the Connecticut territory. Up to a few years ago, he was vice-president of the Bridgeport Safety Emery Wheel Co. and has been associated with the machine and tool business for many years.

PAUL FIELDEN, of the Norton Co., Worcester, Mass., has been elected president of the National Association of Credit Men.

Illinois and Indiana

EVERETT D. GRAFF, first vice-president of Joseph T. Ryerson & Son, Inc., 16th and Rockwell Sts., Chicago, Ill., was

elected president at a recent meeting of the board of directors. Mr. Graff has been with the company for thirty-one years. W. F. KURFESS and V. H. DIETRICH, assistant vice-presidents, were elected vice-presidents. AINSIE Y. SAWYER, formerly assistant vice-president, was made assistant to the president.

THE LINDE AIR PRODUCTS Co., Unit of Union Carbide & Carbon Corporation, 205 E. 42nd St., New York City, announces that work will start immediately in South Chicago, Ill., on the construction of a large manufacturing plant for the production of oxygen. The building, which will be located on Harbor Ave. adjacent to the Calumet River, will be of the most modern type of reinforced-concrete, brick, and steel construction. This new plant will bring the total number of Linde oxygen plants throughout the country to seventy.

DAVE WILKUS, for twenty years engaged in the sale of motors, has become affiliated with the Harnischfeger Corporation, 4536 W. National Ave., Milwaukee, Wis., in the capacity of sales engineer. Mr. Wilkus will sell the P & H line of slip-ring and squirrel-cage motors in the metropolitan Chicago district.

IDEAL COMMUTATOR DRESSER Co., 1011 Park Ave., Sycamore, Ill., has bought the revolution counter business of the Belden Mfg. Co., Chicago, Ill. Hereafter this product will be manufactured at Sycamore.

HAYNES-STELLITE Co., Harrison and Lindsay Sts., Kokomo, Ind., has announced plans for the construction of a new office building, 132 feet long by 44 feet wide. This new structure will be the first of several contemplated to provide room for the growing business. Plans also provide for remodeling the present office building into a recreation center.

Michigan and Wisconsin

CARBOLOY COMPANY, INC., 2987 E. Jefferson Ave., Detroit, Mich., manufacturer of Carboloy cemented-carbide tools, dies, and wheel-dressers, recently announced the following changes in its personnel. F. C. RITNER has been made assistant to the president, in charge of special wear-resistant applications, new developments, and special products. T. D. MACLAFFERTY, formerly of the Detroit office of the General Electric

Co., has been appointed assistant to the general sales manager, Mr. Beardslee. H. C. STONE, formerly of the Newark office, will represent the company in the Brooklyn and New York City territory.

A. E. WHITE, professor of metallurgical engineering and director of the department of engineering research of the University of Michigan, Ann Arbor, Mich., has been elected president of the American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa. H. H. MORGAN, manager of the rail and track fastenings department of the Robert W. Hunt Co., Chicago, Ill., was elected vice-president.

M. J. KEARINS, president, Whitman & Barnes, Detroit, Mich., sailed from New York July 17 for an extended trip to Europe. He will visit Whitman & Barnes distributors in England and continental Europe and will return to America late in August.

DETROIT REX PRODUCTS Co., 13005 Hillview Ave., Detroit, Mich., has made plans to erect a new factory building 100 feet wide by 300 feet long to meet the increasing demand for solvent degreasing equipment.

AJAX FLEXIBLE COUPLING Co., 12 English St., Westfield, N. Y., has appointed the ROLOFF ENGINEERING Co., 610 W. Michigan St., Milwaukee, Wis., sales representative of the company in the Milwaukee district.

New York

OTTO W. WINTER has been appointed factory manager of the Columbus McKinnon Chain Corporation, Tonawanda, N. Y., manufacturer of chain



Everett D. Graff, New President of Joseph T. Ryerson & Son



Otto W. Winter, Factory Manager of the Columbus McKinnon Chain Corp.

and hoist equipment. Mr. Winter has previously been connected with the Kent-Owens Machine Co., Toledo, Ohio, as industrial engineer; with Whitman & Barnes, Detroit, Mich., as general manager of the cutter division; and with Cincinnati Milling Machine and Cincinnati Grinders, Inc., Cincinnati, Ohio, as sales engineer. He also spent a period of time in the U.S.S.R. as consultant to the Soviet machine tool and cutting tool trusts.

DESIGNERS FOR INDUSTRY, INC., of Cleveland, Ohio, industrial designers and product stylists, have established New York quarters in the International Building, Rockefeller Center. A designing staff will be maintained in the New York office, under the direction of H. C. GOODING, who was transferred from the Chicago office to become business manager for the eastern district. GEORGE E. HENRY, formerly associated with the business paper field, has been appointed sales promotion manager, with headquarters in the New York office.

MATTHEW C. BRUSH, formerly head of the American International Corporation, was made a director of the Dardet Threadlock Corporation, 55 Liberty St., New York City, at a recent meeting. HENRY J. KUEHLS, a director of the corporation, was elected vice-president. He has been associated with Mr. Brush since the World War shipbuilding days.

Ohio

NATIONAL CARBON RESEARCH LABORATORIES, INC., Cleveland, Ohio, Unit of UNION CARBIDE AND CARBON CORPORATION, completed, on May 24, their tenth consecutive year, or 1,448,908 man-hours, without a lost-time accident. This unbroken safety record is a tribute to the continued interest on the part of employees in maintaining accident prevention.

FRANK G. BREISACHER has been promoted to the position of assistant sales manager of the replacement and maintenance products department of the Bunting Brass & Bronze Co., Toledo, Ohio. Mr. Breisacher has been connected with the company for several years as salesman in the Michigan territory. E. L. EDWARDS will succeed Mr. Breisacher in that territory.

Pennsylvania

MALCOLM F. JUDKINS has been appointed chief engineer of the Firthite Division of the Firth-Sterling Steel Co., McKeesport, Pa. He has been identified with engineering work in the Firthite manufacturing department since the beginning of the sintered carbide development. Mr. Judkins is chairman of the



Malcolm F. Judkins, Chief Engineer, Firthite Division, Firth-Sterling Steel Co.

sub-committee on metal cutting materials of the American Society of Mechanical Engineers.

READING CHAIN & BLOCK CORPORATION, Reading, Pa., has recently been reorganized and the following officers elected: FRED A. HOWARD, president; FRANK M. HOWARD, secretary and treasurer in charge of manufacturing; PHILIP K. HOWARD, vice-president in charge of sales; and A. K. HARTZELL, chief engineer. Mr. Hartzell was formerly with the Bethlehem Steel Co. at the Johnstown, Pa., plant, and more recently was with the Birdsboro Steel Foundry at Birdsboro, Pa. E. I. HUFF, F. T. TIBBETTS and Ira J. S. REBER are no longer connected with the organization.

DONALD C. BAKEWELL, who recently became affiliated with the Blaw-Knox Co., Pittsburgh, Pa., manufacturer of steel products, has been elected a vice-president.

Utah and California

ALLEN-BRADLEY CO., 1331 S. First St., Milwaukee, Wis., manufacturer of motor control equipment, has appointed the NICKERSON MACHINERY CO., 110 W. Second South St., Salt Lake City, Utah, representative in Utah, southern Idaho, and western Wyoming.

LINCOLN ELECTRIC CO., Cleveland, Ohio, has organized a complete arc-welding sales and engineering service in Sacramento, Calif., with William F. FISCHER, 1241 Thirty-second St., Sacramento, as Lincoln representative. Mr. Fischer has had over five years' extensive experience in the welding field.

COMING EVENTS

SEPTEMBER 19-23—SEVENTH INTERNATIONAL MANAGEMENT CONGRESS in Washington, D. C. Further information can be obtained from Allen Raymond, Room 1201, 347 Madison Ave., New York City.

SEPTEMBER 23-25—CONFERENCE OF THE NATIONAL INDUSTRIAL ADVERTISERS ASSOCIATION at Edgewater Beach Hotel, Chicago, Ill. For further information address National Industrial Advertisers Association, Inc., 100 E. Ohio St., Chicago, Ill.

OCTOBER 4-6—FALL MEETING OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS at the Hotel Lawrence, Erie, Pa. Clarence E. DAVIES, secretary, 29 W. 39th St., New York City.

OCTOBER 4-9—POWER AND MECHANICAL ENGINEERING EXPOSITION at the International Amphitheatre, Chicago, Ill. Further information can be obtained from the Executive Offices of the Exposition, Grand Central Palace, New York City.

OCTOBER 7-9—NATIONAL AIRCRAFT PRODUCTION MEETING OF THE SOCIETY OF AUTOMOTIVE ENGINEERS at the Ambassador Hotel, Los Angeles, Calif. John A. C. WARNER, secretary and general manager, 29 W. 39th St., New York City.

OCTOBER 18-22—NATIONAL METAL CONGRESS AND EXPOSITION to be held in the Atlantic City Auditorium, Atlantic City, N. J., under the auspices of the American Society for Metals, 7016 Euclid Ave., Cleveland, Ohio.

OCTOBER 18-22—EIGHTEENTH ANNUAL MEETING AND EXPOSITION OF THE AMERICAN WELDING SOCIETY at Atlantic City, N. J.; headquarters, Hotel Traymore. Secretary, M. M. KELLY, 33 W. 39th St., New York City.

OCTOBER 27-NOVEMBER 3—NATIONAL AUTOMOBILE SHOW, at Grand Central Palace, New York City, under the auspices of the Automobile Manufacturers Association, 366 Madison Ave., New York City.

DECEMBER 6-11—SIXTEENTH EXPOSITION OF THE CHEMICAL INDUSTRIES to be held at Grand Central Palace, New York City, under the direction of Charles F. ROTH, Grand Central Palace, New York City.

DECEMBER 8-10—NATIONAL PRODUCTION MEETING OF THE SOCIETY OF AUTOMOTIVE ENGINEERS at Flint, Mich. John A. C. WARNER, secretary and general manager, 29 W. 39th St., New York City.

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OBITUARIES

Frank Disston

Frank Disston, first vice-president of Henry Disston & Sons, Inc., Philadelphia, Pa., died at his home on Fairview Road, St. David's, Pa., July 4, after an illness of about a month. He was fifty-eight years old.

Mr. Disston was a grandson of Henry Disston, founder of the saw and tool



Frank Disston

business bearing his name. He was educated at the Penn Charter School and the University of Pennsylvania, Philadelphia. He entered the works at Tacony in 1898, and after a short time left to go into financial work. In 1915, he returned to active association with the company and served as a director and officer until the time of his death. Mr. Disston is survived by his wife, Mrs. Katherine M. Disston.

Richard Prosser

Richard Prosser, senior member of the engineering and steel importing firm of Thomas Prosser & Son, 15 Gold St., New York City, died at his summer home, Weekapaug, R. I., on July 12. Mr. Prosser was born in Brooklyn, N. Y., on October 8, 1864. He spent his entire business life with the firm of his grandfather and father, and was active in the business up until a few months before his death. The firm of Thomas Prosser & Son was established in 1845 by Mr. Prosser's grandfather. The company introduced in this country the original lap-welded iron boiler tube invented by

Mr. Prosser's great uncle. The introduction of the iron tube caused a revolution in boilermaking, as the iron tube permitted the use of much higher steam pressure than the copper tube previously employed. This also resulted in the invention of the Prosser tube expander, which is still in common use in locomotive boiler shops throughout the country.

Mr. Prosser's firm has been the general United States representative of the Fried. Krupp Works of Essen, Germany, continuously since 1851, and has imported a large percentage of the steel locomotive tires and wheels used on American and Canadian railroads, as well as the earliest alloyed steels produced for use in the fabrication of automobiles. Recently, the company introduced to this country the new cutting tool material cemented tungsten carbide, which has caused such a revolution in machine shop practice throughout the world.

The business of the firm will be carried on by Mr. Prosser's son, Roger D. Prosser. Mr. Prosser was also president

and a director of the American Saw Mill Machinery Co., Hackettstown, N. J., as well as a director of the American Saw Works, Hackettstown, N. J.; Corley Mfg. Co., Chattanooga, Tenn.; and Jas. W. Pyke & Co., Montreal, Canada.

HENRY S. DEMAREST, manufacturer of mill supplies, died July 11 at his home, 164 Fulton Ave., Hempstead, L. I., N. Y., after a long illness. He was born in Brooklyn seventy years ago. Mr. Demarest was president and treasurer of Greene, Tweed & Co., 109 Duane St., New York City, and was also a director of the Union Ferry Co. He was a vice-president of the Polish Chamber of Commerce, and was decorated by the Polish Government with the medal of the Order of Polonia Restituta.

WALTER CARY, former vice-president of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., died suddenly of a heart attack on July 2 at his home in New York City.

NEW BOOKS AND PUBLICATIONS

PROCEDURE HANDBOOK OF ARC WELDING DESIGN AND PRACTICE. 839 pages; over 1000 illustrations. Published by the Lincoln Electric Co., Cleveland, Ohio. Price, \$1.50 (postpaid) in the United States; \$2 elsewhere.

The fourth printing of the fourth edition of this welding handbook includes the latest weld symbols adopted by the American Welding Society and a new introduction to Part 6, "Designing for Arc-Welded Steel Construction of Machinery." The new weld symbols occupy sixteen pages, and their use as applied to welded design drawings is fully explained. In addition, an example is given of how the symbols are actually applied in producing a welded design. The new introduction to the section devoted to designing for arc-welded steel construction of machinery emphasizes the fundamental principles which the designer should keep in mind in approaching the problem of redesigning for arc-welded construction. The problem of designing for arc-welding is discussed under three headings: (1) appearance; (2) scheduling the development proper; and (3) modern machinery and technique.

HEALTH PROTECTION OF WELDERS. 27 pages, 5 1/2 by 7 3/4 inches. Published by the Policyholders Service Bureau of the Metropolitan Life Insurance Co., New York City.

Technical developments in welding have brought a great variety of materials into use, with the possibility of producing little-known hazards to health. The purpose of this book is to present information on the subject of protecting welders against such hazards. It discusses the types of welding and lists four principal hazards encountered, namely, electric shock and burns; radiant energy; gases, fumes, and dust; and miscellaneous hazards, such as the possible exhaustion of oxygen in the air breathed, due to pollution by products of combustion in unventilated spaces. Protective measures and methods of treatment for each case are suggested.

HOW PROFITABLE IS BIG BUSINESS? 201 pages, 5 1/2 by 8 inches. Published by the Twentieth Century Fund, Inc., 330 W. 42nd St., New York City. Price, \$2.

This volume is the second of a series summarizing the results of a study of "big business." The first volume, "Big Business: Its Growth and Its Place," traced the growth of the corporate form of business organization in the United States, outlined the development of large corporations, and presented a statistical analysis of the distribution of business wealth and income among corporations of various sizes and between corporations as a whole and unincorporated

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NEWS OF THE INDUSTRY

California and Utah

HERBERTS MACHINERY CO., LTD., Los Angeles, Calif., announces that the company has recently been appointed exclusive representative in southern California and Arizona for the following machine tool and shop equipment manufacturers: AMERICAN TOOL WORKS CO., Cincinnati, Ohio; BARDONS & OLIVER, INC., Cleveland, Ohio; BRYANT CHUCKING GRINDER CO., Springfield, Vt.; CHASO TOOL CO., INC., Royal Oak, Mich.; EX-CELL-O AIRCRAFT & TOOL CORPORATION, Detroit, Mich.; GENERAL MACHINERY CO., Hamilton, Ohio; INTERNATIONAL MACHINE TOOL CO., Indianapolis, Ind.; MATTISON MACHINE WORKS, Rockford, Ill.; NATIONAL BROACH & MACHINE CO., Detroit, Mich.; OSTER WILLIAMS CO., Cleveland, Ohio; RACINE TOOL & MACHINE CO., Racine, Wis.; REED-PRENTICE CORPORATION, Worcester, Mass.; The SEBASTIAN LATHE CO., Cincinnati, Ohio; SUPERIOR MACHINERY & ENGINEERING CO., Detroit, Mich.; and WHITNEY METAL TOOL CO., Rockford, Ill.

LINCOLN ELECTRIC CO., Cleveland, Ohio, has moved the company's San Francisco office from 894 Folsom St. to 866 Folsom St., where 50 per cent greater space will be available for combined sales office, display room, and warehouse. L. P. HENDERSON is manager of the San Francisco office.

LINCOLN ELECTRIC CO., Cleveland, Ohio, has appointed the INDUSTRIAL SUPPLY CO., Salt Lake City, Utah, distributor of its products in that territory. The Industrial Supply Co., of which RUDOLPH ORLOB is president, will handle a complete line of Lincoln products, including the "Shield Arc" welder, "Fleetweld," and other Lincoln electrodes, a variety of arc-welding accessories, and "Linc-Weld" motors.

Illinois

ECLIPSE COUNTERBORE CO., Detroit, Mich., has appointed F. G. JACKSON, 1717 Chicago Daily News Bldg., 400 W. Madison St., Chicago, Ill., direct representative of the company in the Chicago territory. Mr. Jackson has been connected with the Kearney & Trecker Corporation for the last ten years as district sales manager in the Philadelphia, Detroit, and Chicago territories. Before entering the selling field, he had fifteen years of practical experience in various lines of manufacture.

ELMER A. SCHNEIDER, formerly owner of the Mishawaka Pyrometer Instrument Co., Mishawaka, Ind., is now production

manager of the Wheelco Instruments Co., 1112 Milwaukee Ave., Chicago, Ill. Mr. Schneider was formerly connected with the Leeds & Northrup Co. and later with the Brown Instrument Co., both of Philadelphia, Pa.

ELIAS S. CORNELL has been appointed chief engineer of the Delta-Star Electric Co., Chicago, Ill. Mr. Cornell has been assistant chief engineer of the company since 1930. He is a graduate in electrical engineering of the University of Zurich, Switzerland, and became connected with the Delta-Star organization in 1926.

INLAND STEEL CO., Chicago, Ill., has established a Chicago district sales office with LEON C. REED as district sales manager. Mr. Reed became associated with the company in 1909. He has handled sales for the state of Indiana and the south side of Chicago since 1924.

Michigan

E. M. SCHULTHEIS, formerly with the Detroit office of the automotive division of the Timken Roller Bearing Co., has joined the staff of the Clark Equipment Co., Buchanan, Mich. Prior to joining the Timken organization in 1927, Mr. Schultheis was for many years with the White Motor Co. as experimental and design engineer, and previously was with the Aluminum Co. of America and with a number of automobile companies.

WILLEY'S CARBIDE TOOL CO., 1352 W. Vernor Highway, Detroit, Mich., is adding 90,000 cubic feet of factory space adjoining its present plant, in order to take care of the steadily increasing demand for the company's products. The new facilities will be devoted to the manufacture of "laboratory planned" tungsten-carbide tipped tools, gages, etc.

INDUSTRIAL CENTERLESS GRINDING CO., 14630 Schaefer Road, Detroit, Mich., has been organized for the purpose of doing centerless grinding work for manufacturers who do not have centerless grinding equipment. Either short or long runs of centerless grinding jobs will be handled by skilled operators and first-class inspection equipment.

FRANK C. MILLER, formerly associated with the Detroit sales office of the Republic Steel Corporation, Cleveland, Ohio, has been appointed manager of sales of the tin plate division of the corporation. Mr. Miller is a graduate of Columbia University, and since has been connected in a sales capacity with various steel companies.

DETROIT REX PRODUCTS CO., 13005 Hillview Ave., Detroit, Mich., maker of degreasing equipment, has increased its manufacturing facilities by adding to the manufacturing space. New equipment has been purchased and installed to meet the increased demand for the company's product.

GEORGE SUMMERFIELD has been appointed chief inspector of the Hill Diesel Engine Co., Lansing, Mich. Mr. Summerfield was formerly chief inspector with the Hayward-Tyler Co., Luton, England; the Novo Engine Co.; the Reo Motor Car Co.; and the Olds Motor Works.

PIONEER ENGINEERING & MFG. CO., Detroit, Mich., has purchased the CORDUA ENGINEERING CO., also of Detroit. OWEN CORDUA, a die engineer of long experience, brings to the Pioneer organization a group of engineers specially trained in die design.

STEPHENS-ADAMSON MFG. CO., Aurora, Ill., has appointed F. E. DUNLAP branch manager in charge of conveyor sales and engineering for the state of Michigan, with offices in the Book Tower, Detroit.

Missouri and Oklahoma

LESTER F. BLOUGH has been elected vice-president in charge of motor sales of the Emerson Electric Mfg. Co., St. Louis, Mo., and OSCAR C. SCHMITT, has been made vice-president in charge of fan sales and advertising.

ECLIPSE COUNTERBORE CO., 7410-30 St. Aubin Ave., Detroit, Mich., has appointed the BRAMMER MACHINE & TOOL SERVICE CO. of Tulsa, Okla., its exclusive representative in the states of Oklahoma, Kansas, and Texas.

New Jersey

THOMAS CRUTHERS has been appointed vice-president of the Worthington Pump & Machinery Corporation, Harrison, N. J. Mr. Cruthers is a graduate of Stevens Institute of Technology. In 1907, he became connected with the Worthington corporation as superintendent of gas-engine erecting at the Snow Steam Pump Works, Buffalo, N. Y., a Worthington subsidiary. In 1908, he was transferred to the sales department; in 1927, he became New York district sales manager; in 1930, assistant general sales manager; and in 1932, assistant vice-president in charge of sales.

KINGSTON-CONLEY ELECTRIC CO., 66 York St., Jersey City, N. J., manufacturer of fractional-horsepower alternating-current motors, has acquired a new factory at 68 Brook Ave., North Plainfield, N. J., with a floor space of approximately 25,000 square feet. In its larger quarters, the company will be able to add a number of new types of motors to its line.

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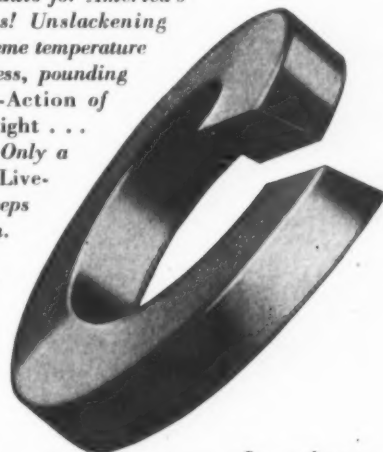


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MACHINERY, September, 1936—87

New England

STEDFAST & ROULSTON, INC., Boston, Mass., have added OWEN C. STEVENS to their sales engineering force. Mr. Stevens, who was formerly with the R. K. LeBlond Machine Tool Co., will be located in the Springfield, Mass., territory. LEE R. DAVIS, who has previously been connected with the Kearney & Trecker Corporation and the American Can Co., will handle sales engineering work in the Connecticut territory.

E. W. MILLER, chief engineer of Fellows Gear Shaper Co., Springfield, Vt., recently sailed for an extended business trip to Europe. Mr. Miller plans to visit England, France, Italy, Germany, and possibly Poland and Russia.

New York

P. M. MAHLER & Co., INC., New York City, foreign sales managers, announce that they have taken new and larger quarters at 115 Broad St. R. F. MAHLER has been appointed secretary-treasurer, and FRITZ MAHLER, assistant secretary. P. M. MAHLER, president, is leaving on his fourth trip to Latin America about October 1.

T. G. BAER has been appointed manager of the Buffalo office of the Timken Roller Bearing Co., Canton, Ohio. Mr. Baer, a graduate of Purdue University, joined the Timken organization in 1929, and has for some time been connected with the Chicago office of the company.

EDWIN J. SCHWANHAUSSER, manager of the Buffalo Works of the Worthington Pump & Machinery Corporation, has been elected president of the Buffalo Chamber of Commerce. Mr. Schwannhauser is a graduate of the Stevens Institute of Technology.

H. E. EATON, general manager of eastern sales and export of the Michigan Tool Co., the Colonial Broach Co., the Detroit Tap & Tool Co., and the Metropolitan Industrial Division of the Davis Boring Tool Co., has removed his New York office to 51 E. 42nd St.

W. J. HERMES has been appointed representative of the Dumore Co., Racine, Wis., builder of precision grinders, tools, and motors, in the metropolitan New York area. Mr. Hermes' office is located at 100 Varick St., New York City.

Ohio

WELDON TOOL CO., 321 Frankfort Ave., Cleveland, Ohio, specializing in end-mills and milling cutters, has appointed ELMER B. HAUSER research metallurgist. Mr. Hauser, a graduate of the Case School of Applied Science, has been chief metallurgist with the National Tool Co.,

Cleveland, Ohio, for eleven years, and has also been with the Bourne-Fuller Co. for several years.

LINCOLN ELECTRIC CO., Cleveland, Ohio, has made arrangement to represent, in the United States, the MESSER Co., of Frankfort-on-Main, Germany, patentee of a low-priced automatic oxygen machine whereby oxygen for cutting and welding by the acetylene process can be produced in the user's own plant.

MERIAM CO., 1955 W. 112th St., Cleveland, Ohio, has just completed an addition 54 by 100 feet to its present plant. The increased facilities will provide for handling heavy engines and parts and permit the welding division to expand.

J. L. VERGILIO Co., 942 Prospect Ave., Cleveland, Ohio, has been appointed sales agent for northern Ohio by the OHIO ELECTRIC MFG. CO., of Cleveland, manufacturer of fractional-horsepower motors.

Pennsylvania

HENRY DISSTON & SONS, INC., Philadelphia, Pa., recently held a sales convention, which was attended by the company's branch managers and salesmen in the eastern territory. Part of the two days of the convention was spent in the plant, inspecting much new equipment that has recently been installed. In the past year the company has expended more than half a million dollars for new equipment and buildings.

J. H. REDHEAD has been elected executive vice-president and general manager of the Erie Malleable Iron Co., Erie, Pa. Mr. Redhead will also continue actively in charge as president and treasurer of the Lake City Malleable Co., Cleveland, Ohio. In addition, he has operated, for several years, the Malleable Division of the Warren Tool Corporation, Warren, Ohio.

J. M. MCKIBBIN has been appointed manager of the newly created sales promotion department of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Mr. McKibbin has been associated with the Westinghouse organization since 1920, and has been sales promotion manager at the Cleveland, Detroit, and Pittsburgh sales offices.

HORACE C. DISSTON, manager of the steel sales department of Henry Disston & Sons, Inc., Philadelphia, Pa., was in Germany during August with the American athletes representing the United States at the Olympic games. Mr. Disston, an expert hockey player, is captain of the Field Hockey Team which represents this country in that sport.

LANDIS TOOL CO., Waynesboro, Pa., has opened an office at 6910 Market St., Upper Darby, Pa. C. M. TALHELM, who has represented the company in the Philadelphia territory for a number of years, will be in charge of the new office.

Wisconsin

MAGNETIC MFG. CO., Milwaukee, Wis., announces that the corporate name of the company has been changed to STEARNS MAGNETIC MFG. CO., effective August 1. The change in name does not involve any change in corporate structure, management, or plant location, but is simply an effort to more closely identify the company with its trademark name "Stearns." The company has begun building operations on an extension to its plant at 635 S. 28th St., Milwaukee, Wis. The new building will provide almost double the capacity of the present facilities. It was necessitated by the increasing demand for manufacturing space to meet the present volume of business.


RUDOLPH FURRER has been appointed industrial engineer of the manufacturing department of the Allis-Chalmers Mfg. Co., Milwaukee, Wis. Mr. Furrer first



Rudolph Furrer, Industrial Engineer with the Allis-Chalmers Mfg. Co.

became connected with the Allis-Chalmers organization in 1907, at the former Scranton plant of the company. In 1911, he came to the West Allis Works at Milwaukee. In 1918, he joined the A. O. Smith Corporation as mechanical engineer, and later became connected with the National Tube Co., from where he returns to Allis-Chalmers.

R. W. DAVIS has recently been appointed assistant manager of the electrical department of the Allis-Chalmers Mfg. Co., Milwaukee, Wis. Mr. Davis is a graduate of the University of South Dakota, as well as of the Massachusetts Institute of Technology, where he specialized in electrical engineering. After graduation, he became connected, in 1908, with the Allis-Chalmers company, and has since been engaged in the electrical engineering and sales engineering departments.



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item that directly controls the relative effectiveness of every other tool in the shop. It is a factor in the cost equation which has often been responsible for worthwhile profits.

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COOPER-HEWITT MERCURY VAPOR LIGHT

DUMORE Co., Racine, Wis., manufacturer of electric motors and electric appliances, sends some figures indicating definite business improvement. Since February, 1935, employment in the company's plant has increased 58 per cent, sales have gone up 60 per cent, and the payroll has increased 109 per cent.

neers, of the Western Society of Engineers, and of the Norwegian-American Engineering Society. He was also president of the Norwegian Club of Chicago for several years. He is the author of a book "The Capitalistic System and the Nature of Unemployment," which is scheduled for publication in the near future.

SEPTEMBER 16-19—Meeting of the AMERICAN SOCIETY OF MECHANICAL ENGINEERS at Niagara Falls, N. Y., covering sessions on power, transportation, engines, fuels, hydraulics, and wood industries. C. E. Davies, secretary, 29 W. 39th St., New York City.

OCTOBER 5-10—FOURTH ANNUAL INDUSTRIAL MATERIALS EXHIBIT to be held at the Hotel Roosevelt, New York City. For information, address News Bureau, Industrial Materials Exhibit, care of Don Masson, Bakelite Corporation, 247 Park Ave., New York City.

OCTOBER 19-23—NATIONAL METAL CONGRESS, sponsored by the American Society for Metals, the American Welding Society, the Wire Association, the Institute of Metals and the Iron and Steel Divisions of the American Institute of Mining and Metallurgical Engineers, to be held in the Cleveland Public Auditorium, Cleveland, Ohio.

OCTOBER 19-23—Seventeenth annual meeting of the AMERICAN WELDING SOCIETY at the Hotel Cleveland, Cleveland, Ohio. Secretary, M. M. Kelly, 33 W. 39th St., New York City.

OCTOBER 19-23—Annual METAL EXPOSITION to be held in the Public Auditorium, Cleveland, Ohio, under the auspices of the American Society for Metals. W. H. Eisenman, secretary, American Society for Metals, 7016 Euclid Ave., Cleveland, Ohio, managing director of the exposition.

OCTOBER 22-23—Meeting of the AMERICAN SOCIETY OF MECHANICAL ENGINEERS at Cleveland, Ohio, devoted to a symposium on welding practice, under the auspices of the Machine Shop Practice Division. C. E. Davies, secretary, 29 W. 39th St., New York City.

NOVEMBER 11-18—NATIONAL AUTOMOBILE SHOW, Grand Central Palace, New York City. Alfred Reeves, manager, 366 Madison Ave., New York City.

NOVEMBER 18-20—NATIONAL FOREIGN TRADE CONVENTION at Chicago, Ill. For further information, address National Foreign Trade Council, 26 Beaver St., New York City.

NOVEMBER 18-20—Thirty-seventh annual convention of the INTERNATIONAL ACETYLENE ASSOCIATION to be held at the Jefferson Hotel, St. Louis, Mo. Office of the Association, 30 E. 42nd St., New York City.

NOVEMBER 30-DECEMBER 4—Annual meeting of the AMERICAN SOCIETY OF MECHANICAL ENGINEERS in New York City. C. E. Davies, secretary, 29 W. 39th St., New York City.

NOVEMBER 30-DECEMBER 5—NATIONAL EXPOSITION OF POWER AND MECHANICAL ENGINEERING to be held at the Grand Central Palace, New York City. For further information, address Charles F. Roth, manager, Grand Central Palace, New York City.

OBITUARIES

Neal R. Townley

Neal R. Townley, president of the Walcott Machine Co. and the Crankshaft Machine Co., both of Jackson, Mich., died on July 13 at the W. A. Foote



Neal R. Townley

Memorial Hospital, after a lingering illness. He was forty-one years old. Except for the period when he was in the Service during the World War, Mr. Townley had been connected with the Walcott Machine Co. during his entire business career. He is survived by his widow and two sons.

Alfred Alsaker

Alfred Alsaker, chief engineer of the Delta-Star Electric Co., Chicago, Ill., died at Long Beach, N. Y., August 3, following injuries received when he was struck by a motorcycle. Mr. Alsaker was born in Norway in 1884 and was educated in electrical engineering there. After arriving in the United States, he became connected, in 1906, with the Commonwealth Edison Co. in Chicago. In 1916, he went with the Delta-Star Electric Co.

Mr. Alsaker was a member of the American Institute of Electrical Engi-

Stanley W. Heald

Stanley Winslow Heald, associated with his brothers in the management of the Heald Machine Co., Worcester, Mass., died at the Heald summer home at West Falmouth, Mass., August 14, after an illness of several months. Mr. Heald was twenty-eight years old, having been born in Worcester, August 9, 1908. He was a graduate of the Worcester Academy and studied mechanical engineering at the Worcester Polytechnic Institute. Mr. Heald is survived by his mother; his widow, Mrs. Frances E. (Thayer) Heald; his son, Gordon Thayer; and his three brothers, Roger N., Richard A., and Robert S. Heald, all of Worcester.

ROBERT S. MURRAY, former treasurer of the General Electric Co., Schenectady, N. Y., died on July 29 at his home in Schenectady. He had been in poor health about a year and retired from his position on May 1, this year. Mr. Murray was born in Chatham, New Brunswick, in 1868. He entered the employ of the General Electric Co. in 1893, in the accounting department of the general office, then located in Boston. In 1910, he was elected assistant treasurer, and in 1925, he became treasurer.

HUBBARD D. NITCHIE, Sr., who was continuously employed, except for a few years, in the engineering and sales department of the Watson-Stillman Co., Roselle, N. J., following his graduation from Cornell in 1897, died suddenly at his home in Cranford, N. J., on August 2.

COMING EVENTS

SEPTEMBER 8-10—Semi-annual convention of the AMERICAN GEAR MANUFACTURERS ASSOCIATION to be held on board the S.S. *Seeandbee*, leaving Chicago, Tuesday morning, September 8, and arriving in Cleveland, Thursday evening, September 10. J. C. McQuiston, manager-secretary, Penn-Lincoln Hotel, Wilkesburg, Pa.

SEPTEMBER 14-15—Meeting of the PLAIN WASHER MANUFACTURERS' ASSOCIATION at Hotel Statler, Cleveland, Ohio.

New England

ELLIOTT C. PADDOCK has been appointed to the newly created position of field sales manager of the Greenfield Tap & Die Corporation, Greenfield, Mass., manufacturer of threading and cutting tools. Mr. Paddock's headquarters will be at the company's main office in Greenfield, but he will spend the greater part of his time in the field. He has been covering Connecticut and western Massachusetts for the company for the last ten years.

W. W. SLY MFG. CO., 4700 Train Ave., Cleveland, Ohio, manufacturer of foundry cleaning-room equipment, sandblast equipment, and dust control equipment, has appointed ALEXANDER HAIGH, 141 Milk St., Boston, Mass., representative of the company for the New England states.

HOLLO-KROME SCREW CORPORATION, Bristol, Conn., is building a new factory in Hartford, Conn. The new building is of brick, 200 feet long by 90 feet wide. The main part of the building will be devoted to manufacturing, while the executive offices will be on the second floor. An adjoining building will house the heat-treating department. The rapid growth of the company's business has necessitated the building of this new plant.

WALTER D. SNYDER has been appointed eastern sales representative for the Ajax Mfg. Co., Cleveland, Ohio, builder of hot metal working machinery. Mr. Snyder's offices are located in the Dewart Bldg., New London, Conn.

New York and New Jersey

JOHN GAILLARD, industrial engineer, and a member of the staff of the American Standards Association, will give a series of eight lectures on the engineering and management aspects of industrial standardization in the auditorium of Metal Products Exhibits, Inc., Rockefeller Center, New York City, during the months of October and November. The subscription fee for the series is \$12, or \$10 for members of engineering societies and students registered at engineering colleges. Members of engineering societies can obtain complimentary tickets for the first lecture, which will be held on October 7, upon application to Room 807, 29 W. 39th St., New York City.

FEDERAL BEARINGS CO., INC., Poughkeepsie, N. Y., announces that, to meet the growing demand for Federal ball bearings and ball bearing products, a quarter of a million dollar expansion program for plant and equipment is being put under way. The plans include a large addition, 160 by 60 feet, three stories high, to the present buildings, and a number of alterations in the layout of the present plant. The changes will provide about 35,000 additional

square feet of floor space. Approximately one thousand operators will be employed when the expansion has been completed.

H. J. FRENCH, in charge of alloy steel and iron developments for the International Nickel Co., Inc., New York City, addressed the North West Chapter of the American Society for Metals, September 14, at Minneapolis. Mr. French reviewed the more interesting phases of the year's progress in the manufacture, selection, and utilization of alloy steels.

REYNOLDS SPRING CO., Jackson, Mich., has opened a sales office in New York City at 90 West St. to meet the rapidly growing demand for Reynolds molded plastics. HERBERT S. REYNOLDS, JR., will have charge of the new office.

TIMKEN STEEL & TUBE CO., Canton, Ohio, announces the removal of its New York office from 16 W. 60th St. to 165 Broadway. ARTHUR R. ADELBERG is New York district manager.

TUNGSTEN ELECTRIC CORPORATION, 540 Thirty-ninth St., Union City, N. J., announces that the EISLER ELECTRIC CORPORATION has acquired the interests of the Bissett Steel Co. and of George Bissett in the Tungsten Electric Corporation (Bissett Steel Division). In the future, the Bissett Steel Co. and George Bissett will have no further connection with the Tungsten Electric Corporation. F. M. WOODFORD will continue as western manager and will look after the interests of the company at the western office, 3030 Euclid Ave., Cleveland, Ohio.

Ohio

FRANK J. LASKEY, formerly assistant general purchasing agent of the Republic Steel Corporation, Youngstown, Ohio, has been appointed general purchasing agent, and ROBERT E. SHERRATT has been made assistant general purchasing agent. Mr. Laskey has had wide experience in the purchasing departments of various steel companies.

FIRTH-STERLING STEEL CO., McKeesport, Pa., announces the opening of a new branch office and warehouse at 415 W. 5th St., Dayton, Ohio, under the management of GEORGE W. FRICK, JR.

L. H. MESKER, 920 Hollenden Hotel, Cleveland, Ohio, has been appointed exclusive sales agent for the line of lathes, die-casting machines, and injection molding machines made by the REED-PRENTICE CORPORATION, Worcester, Mass.

Pennsylvania

J. H. McELHINNEY, general superintendent of the Lukens Steel Co., Coatesville, Pa., has resigned to become asso-

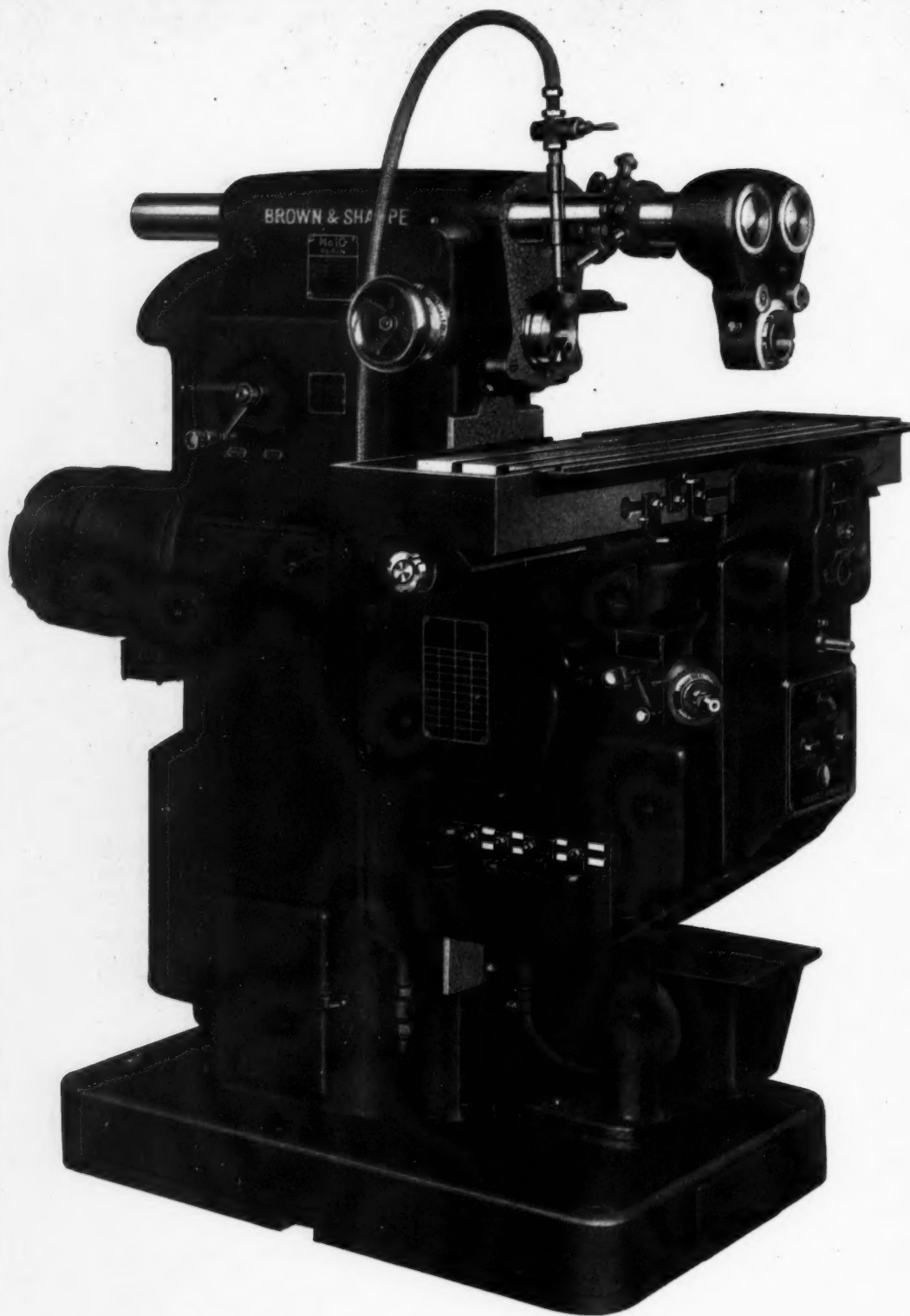


G. Donald Spackman, New General Superintendent of Lukens Steel Co.

ciated with another steel company. Mr. McElhinney has been connected with the company since 1926, when he was appointed assistant manager of production, which position he held for three years until he was promoted to the position of general superintendent. G. DONALD SPACKMAN, previously president of Lukens Steel Co., and prior to that assistant general superintendent of the Lukens Steel Co., will succeed Mr. McElhinney as general superintendent. Mr. Spackman first joined the organization in the summer of 1919. LESTER M. CURTISS, who was appointed superintendent of production a few months ago, will continue in charge of all production.

FIRTH-STERLING STEEL CO., McKeesport, Pa., is erecting a new sintered carbide plant. The building will be two stories in height and will be erected so that more floors can be added. It will be used for the manufacture of tungsten-carbide tools and dies sold by the company under the trade names "Firthalloy" and "Firthlite." The building will be 210 feet long by 95 feet wide, and is to be equipped with dust removal and recovery system; parts of it, where the manufacturing process is particularly noisy, will be sound-proofed. The air for the building will be filtered and conditioned.

CARNEGIE-ILLINOIS STEEL CORPORATION (Subsidiary of the United States Steel Corporation), Pittsburgh, Pa., has adopted the trade name "USS Carilloy" to identify the alloy steels produced by this company. The name does not signify a new product nor apply to any single alloy steel. It will serve as a quality trademark for the entire group of alloy steels previously marketed as Carnegie-Illinois alloy steels.



Centralized electrical controls govern all movements of table and spindle. . . . Movements exceptionally rapid and precise. . . . Wide choice of automatic cycles with automatic spindle stop.

No. 10

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Capacity

Longitudinal Feed of Table 12"

Transverse Adjustment of Spindle 2"

Vertical Adjustment of Knee 11½"

Ask for descriptive circular of the new No. 10 Plain Milling Machine for rapid manufacture of small parts.

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... ANOTHER NEW *Electrically Controlled* PRODUCTION MILLING MACHINE

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many of the proved design features of the *electrically controlled* No. 12 Plain Milling Machine and many advanced construction features of the increasingly popular "Light Type."

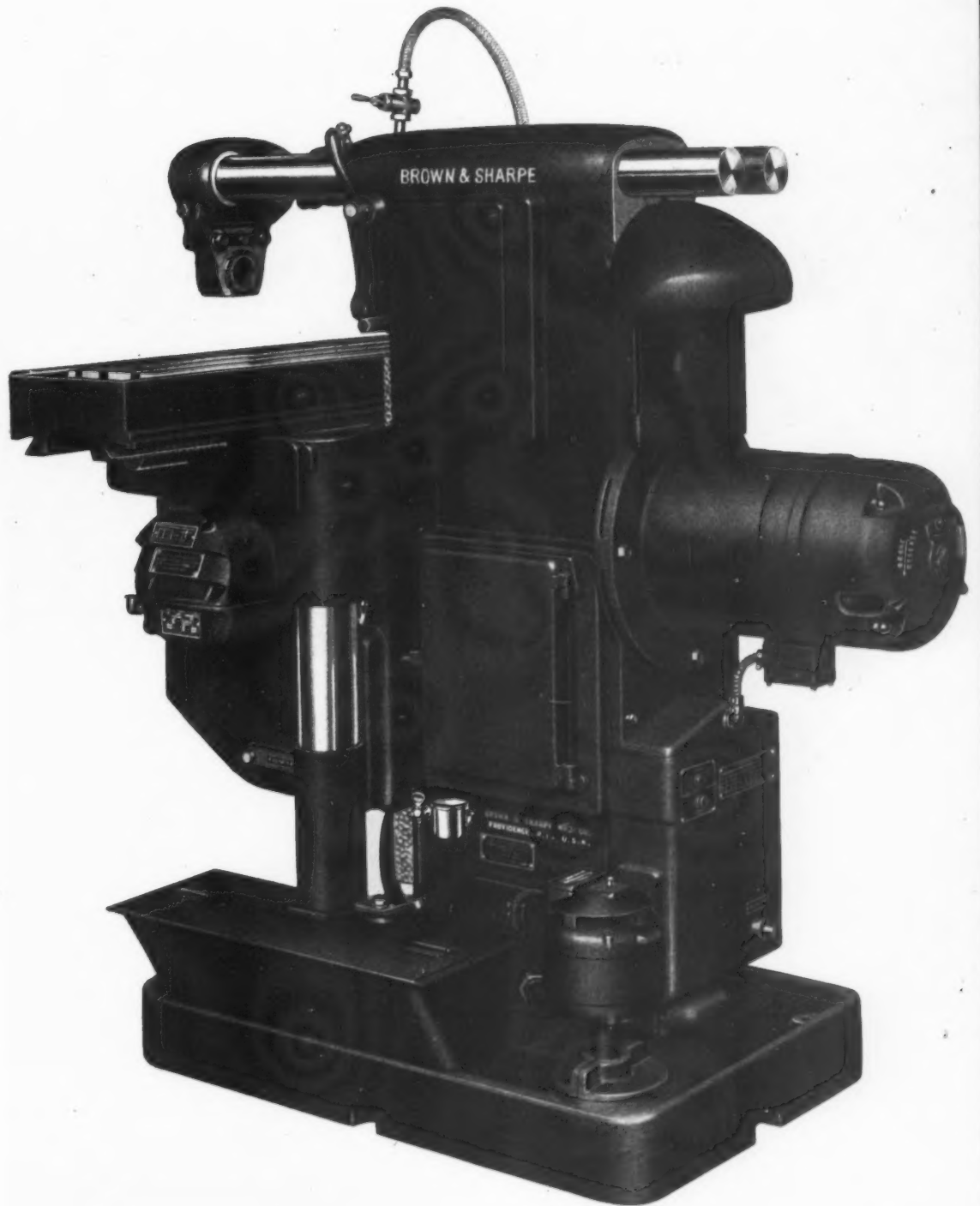
Spindle Speeds

16 Speeds
55 to 1800 R.P.M.

Table Feeds

16 Rates
Standard range
 $\frac{1}{2}$ " to $20\frac{1}{2}$ " per min.

Brown & Sharpe Mfg. Co.
Providence, R. I., U. S. A.



SHARPE

GEORGE I. WRIGHT has been appointed transportation sales and division manager of the Westinghouse Electric & Mfg. Co. with headquarters at East Pittsburgh, Pa. A. C. STREAMER, formerly transportation manager, has been appointed manager of the switchgear division of the company.

A. R. ELLIS has been appointed president of the Pittsburgh Testing Laboratory, Pittsburgh, Pa. Mr. Ellis has been connected with the Laboratory since 1905, and has been advanced from one position of responsibility to another.

C. N. KIRKPATRICK, secretary and sales manager of the Landis Machine Co., Inc., Waynesboro, Pa., recently sailed on a trip to England and the Continent in the interests of his company.

Wisconsin and Indiana

FRANK W. LADKY has been appointed sales agent in the state of Wisconsin for the sale of hot- and cold-rolled steel strip manufactured by the West Leechburg division of the Allegheny Steel Co., Pittsburgh, Pa. His headquarters will be in the Bankers Bldg., Milwaukee. DAVID A. GARLICK will be associated with Mr. Ladky.

R. B. NICHOLS has recently been appointed manager of the Industrial Bearing Division of the Bantam Ball Bearing



R. B. Nichols, Manager, Industrial Bearing Division, Bantam Ball Bearing Co.

Co., South Bend, Ind. Mr. Nichols was factory superintendent for four years previous to becoming manager of the Chicago office, which position he has held for the last eight years.

COMING EVENTS

OCTOBER 5-10—FOURTH ANNUAL INDUSTRIAL MATERIALS EXHIBIT to be held at the Hotel Roosevelt, New York City. For information, address News Bureau, Industrial Materials Exhibit, care of Don Masson, Bakelite Corporation, 247 Park Ave., New York City.

OCTOBER 13—Monthly evening meeting of the Hudson River Valley Division of the SPECIAL TOOL, DIE AND MACHINE SHOP INSTITUTE, INC., at the Hotel Pennsylvania, New York City. Sidney Diamant, president, 401 Mulberry St., Newark, N. J.

OCTOBER 19-23—NATIONAL METAL CONGRESS, sponsored by the American Society for Metals, the American Welding Society, the Wire Association, the Institute of Metals and the Iron and Steel Divisions of the American Institute of Mining and Metallurgical Engineers, to be held in the Cleveland Public Auditorium, Cleveland, Ohio.

OCTOBER 19-23—Seventeenth annual meeting of the AMERICAN WELDING SOCIETY at the Hotel Cleveland, Cleveland, Ohio. Secretary, M. M. Kelly, 33 W. 39th St., New York City.

OCTOBER 19-23—Annual METAL EXPOSITION to be held in the Public Auditorium, Cleveland, Ohio, under the auspices of the American Society for Metals. W. H. Eisenman, secretary, American Society for Metals, 7016 Euclid Ave., Cleveland, Ohio, managing director of the exposition.

OCTOBER 22-23—Meeting of the AMERICAN SOCIETY OF MECHANICAL ENGINEERS at Cleveland, Ohio, devoted to a symposium on welding practice, under the auspices of the Machine Shop Practice Division. C. E. Davies, secretary, 29 W. 39th St., New York City.

NOVEMBER 11-18—NATIONAL AUTOMOBILE SHOW, Grand Central Palace, New York City. Alfred Reeves, manager, 366 Madison Ave., New York City.

NOVEMBER 18-20—NATIONAL FOREIGN TRADE CONVENTION at Chicago, Ill. For further information, address National Foreign Trade Council, 26 Beaver St., New York City.

NOVEMBER 18-20—Thirty-seventh annual convention of the INTERNATIONAL ACETYLENE ASSOCIATION to be held at the Jefferson Hotel, St. Louis, Mo. Office of the Association, 30 E. 42nd St., New York City.

NOVEMBER 30-DECEMBER 4—Annual meeting of the AMERICAN SOCIETY OF

MECHANICAL ENGINEERS in New York City. C. E. Davies, secretary, 29 W. 39th St., New York City.

NOVEMBER 30-DECEMBER 5—NATIONAL EXPOSITION OF POWER AND MECHANICAL ENGINEERING to be held at the Grand Central Palace, New York City. For further information, address Charles F. Roth, manager, Grand Central Palace, New York City.

OBITUARIES

William H. Nicholls

William H. Nicholls, president of the William H. Nicholls Co., Inc., Richmond Hill, Long Island, N. Y., died in August. Mr. Nicholls had served the foundry industry for over forty years, the greater part of which time was spent in solving the problems of the foundries to increase production and lower costs. He had many valuable machinery inventions to his credit.

Mr. Nicholls was born and educated in New York City. At the age of sixteen, he entered the foundry industry as an apprentice molder, continuing his studies at night. He studied engineering at the Pratt Institute of Brooklyn. In the early days of his career, he served as a molder in various foundries, gaining a practical knowledge of the foundry industry in general. In 1910 he started the business of which he was president at the time of his death.

J. J. Oller

J. J. Oller, president of the Landis Machine Co., Inc., Waynesboro, Pa., died at his home in Waynesboro on September 3 at the age of eighty-one years. Mr. Oller became a director of the company in 1907, and was elected president in 1910, which position he held until the time of his death. He was prominently identified with the industrial life of the community in which he lived, and for years was active in all community movements involving welfare.

* * *

Buick Motor Co. Plans Plant Expansion

The Buick Motor Co., Flint, Mich., is planning a \$14,500,000 plant expansion and revision program for 1937. This is in addition to the \$15,000,000 appropriation spent by the company on expansion and rehabilitation a year ago. With the completion of the present plans, the production capacity will be increased 25 per cent.

DAVIS BORING TOOL Co., INC., 6200 Maple Ave., St. Louis, Mo., has appointed the MACHINERY & TOOL SALES, INC., 401 New Center Bldg., Detroit, Mich., representative of the company in the Detroit territory.

M. A. CLARK, of the U. S. Rubber Products, Inc., Detroit, Mich., has been elected general chairman of the executive committee of the Automotive and Machine Shop Section of the National Safety Council.

HARRY T. WOOLSON, executive engineer of the Chrysler Corporation, Detroit, Mich., has been nominated for president of the Society of Automotive Engineers for 1937.

New England

LEEDS & NORTHRUP Co., 4921 Stenton Ave., Philadelphia, Pa., recently opened a consulting and sales engineering office at 422 Chamber of Commerce Bldg., 80 Federal St., Boston, Mass. The complete Leeds & Northrup line of measuring, recording, and controlling instruments, as well as electric heat-treating furnaces, will be handled through this office.

BRISTOL Co., Waterbury, Conn., announces the appointment of four graduate engineers to its field service organization. The newly appointed men are E. H. HART, who will be connected with the Boston office, Consolidated Bldg.; J. N. SWARR, who has been assigned to the New York office, 220 E. 42nd St.; K. J. PLATT, assigned to the Philadelphia office, Market St. National Bank Bldg.; and R. A. BARNES, connected with the St. Louis office, Boatmen's Bank Bldg.

E. C. BULLARD, vice-president and general manager of the Bullard Co., Bridgeport, Conn., sailed on October 1 for an



E. C. Bullard, Vice-President and General Manager of the Bullard Co.

extended business trip throughout Europe. He will visit Sweden, Russia, Germany, France, England, and other countries if conditions permit. According to present plans, he will return about the middle of December.

New York

CHARLES G. THOMA has joined the staff of Sheldon, Morse, Hutchins & Easton, Inc., 420 Lexington Ave., New York City, advertising and public relations counsel. Mr. Thoma was formerly advertising and sales promotion manager for the Firth-Sterling Steel Co., McKeesport, Pa.

FRANK SCHUBERT, who for the last three years has been assistant to the president of the Bearings Co. of America, Lancaster, Pa., has become associated with the management of the Houde Engineering Corporation, a division of Houdaille-Hershey, of Buffalo, N. Y.

W. C. STRAUB, formerly manager of the New York branch office of the Chicago Pneumatic Tool Co., 6 E. 44th St., New York City, has been appointed assistant to the executive vice-president. A. D. STEM will succeed Mr. Straub as manager of the New York office.

HAMMOND MACHINERY BUILDERS, INC., Kalamazoo, Mich., has established a new eastern branch office and sales rooms at 148 W. 23rd St., New York City. W. J. Holtmeier has been appointed eastern manager, in charge of the new branch.

Ohio

WILLIAM B. TERBEEK, formerly connected with the White Motor Co., Cleveland, Ohio, in the Shop Engineering Division, and later general factory superintendent of the Great Lakes Aircraft Corporation of Cleveland, is now affiliated with the Cleveland Duplex Machinery Co., Inc., as sales engineer, specializing in the sale of production machine tools and allied equipment.

PRODUCTO MACHINE Co., Bridgeport, Conn., has appointed PERRY W. RICE sales representative in the Cleveland, Ohio, district for the sale of Producto die sets, accessories, and Producto-Matic milling machines. Mr. Rice was for many years manager of the Chicago office of the Hendey Machine Co., Torrington, Conn., and recently severed his connection with that company.

AL. P. WITTEMAN, formerly with Nash Motors and for the last ten years with the Falk Co., Milwaukee, Wis., has joined the sales organization of the Lealand-Gifford Co., Worcester, Mass., and will have charge of the Cleveland territory. Mr. Witteman's office will be at 2024 E. 86th St., Cleveland.

MODERN TOOL WORKS, Division of Consolidated Machine Tool Corporation, Rochester, N. Y., announces the opening of a new office in the Union Building, 1836 Euclid Ave., Cleveland, Ohio. JOHN B. MORETON is in charge of sales and service in the Cleveland territory.

A. A. JAMIESON has joined the sales force of William K. Stamets, Pittsburgh, Pa., and will cover the Ohio territory, with headquarters in the Rockefeller Bldg., Cleveland. Mr. Jamieson was connected with the Westinghouse Electric & Mfg. Co. for many years, and more recently was with the Carboloy Co.

GEORGE W. DUNCAN, who was connected for sixteen years with the fractional motor department of the General Electric Co. at Fort Wayne, Ind., has joined the sales staff of the Ohio Electric Mfg. Co., Cleveland, Ohio, as assistant motor sales manager.

FRANK BURGAN, representing the Small Tool Division of the Ingersoll Milling Machine Co., Rockford, Ill., is now covering the northeast section of Ohio, succeeding HENRY P. BOGGIS & Co., of Cleveland.

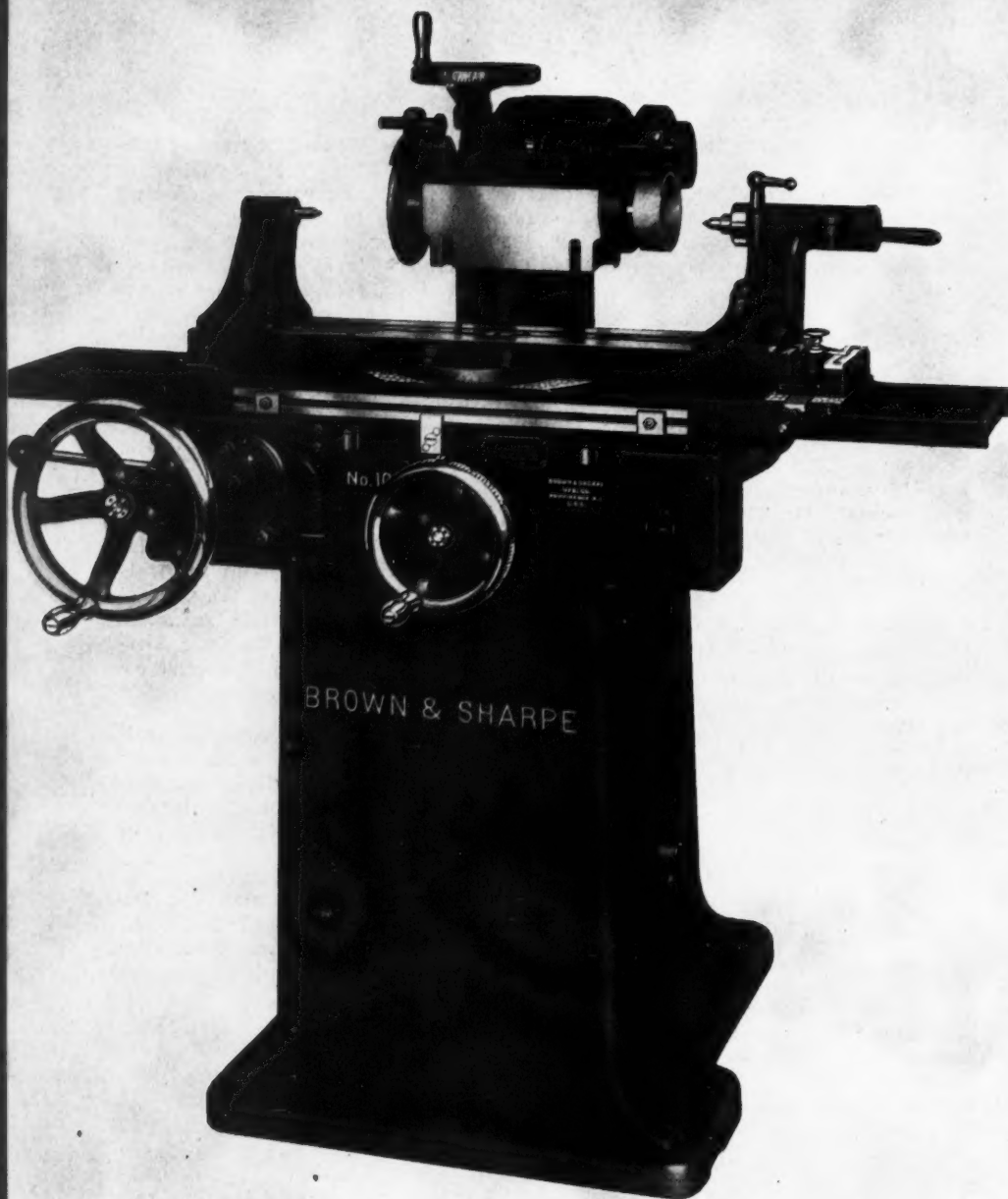
DE Vlieg MILLING MACHINE Co., Detroit, Mich., has appointed the J. C. WHITNEY MACHINERY Co., Rockefeller Bldg., Cleveland, Ohio, dealer in the Cleveland territory.

Pennsylvania

EVERETT CHAPMAN has been elected president of Lukenweld, Inc., Division of the Lukens Steel Co., Coatesville, Pa. He was previously vice-president of the company. Mr. Chapman succeeds G. DONALD SPACKMAN, whose promotion to the position of general superintendent of the



Everett Chapman, President of Lukenweld, Inc., Division of Lukens Steel Co.



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CUTTER and Tool GRINDER

- • **Single Operating Position**
due to reduced height and
location of all controls.
- • **Motor Driven**——with
enclosed controls and wiring.

Let us send circular and specifications of this *advanced design* cutter and tool grinding machine. Brown & Sharpe Mfg. Co., Providence, R.I., U.S.A.

Page 232-B

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Features for
**Convenient
Operation and
Long Life**
Assure an
Economical
Investment



Note ease with which operator can watch the "cut" while controlling all movements from a single operating position.

. . .

Regular Equipment furnished is unusually complete to accommodate a wide variety of cutters and tools.

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Page 232-C

SHARPE



Robert J. Whiting, Vice-President of Lukenweld, Inc., Division of Lukens Steel Co.



Lester M. Curtiss, Assistant General Superintendent of the Lukens Steel Co.

Lukens Steel Co. was mentioned in October MACHINERY. ROBERT J. WHITING, who has been superintendent of Lukenweld, Inc., in charge of all manufacturing, has been elected vice-president. LESTER M. CURTISS, previously superintendent of production of the Lukens Steel Co., has been promoted to the position of assistant general superintendent of that company.

R-S PRODUCTS CORPORATION, 4530 Germantown Ave., Philadelphia, Pa., has taken over the business of manufacturing standard appliances for anti-friction bearing mountings formerly known as the BEARING APPLIANCE CO., of Ardmore, Pa. This business consists of the manufacture and sale of complete closures for approximately 150 sizes of ball and tapered roller bearings in a number of types to suit many design combinations. These closures are finished ready for use. Typical styles were shown in an article on these housing closures which appeared in April, 1935, MACHINERY.

GEORGE H. BUCHER was elected executive vice-president of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., at a recent meeting of the board of directors. Mr. Bucher is also president and general manager of the Westinghouse Electric International Co.

H. H. CLEVELAND, who has been connected for twenty-four years with the Billings & Spencer Co., Hartford, Conn.—the last five years in the capacity of general sales manager—has become associated with the Bonney Forge & Tool Works, Allentown, Pa.

H. H. STECK, formerly with the Norton Co., Worcester, Mass., has been appointed grinding wheel sales representative in the Pittsburgh district for United States Rubber Products, Inc., 1790 Broadway, New York City.

West Virginia and Kentucky

LINDE AIR PRODUCTS Co., Unit of Union Carbide and Carbon Corporation, 205 E. 42nd St., New York City, announces the opening of a new district office at 2 Virginia St., Charleston, W. Va. A. R. O'NEAL has been appointed district manager.

NEW YORK BELTING & PACKING CO., Passaic, N. J., has appointed the LAIB Co., Inc., 754 S. First St., Louisville, Ky., distributor of the company's products in the Louisville territory.

Wisconsin

W. G. NICHOL Co., 711 W. Michigan St., Milwaukee, Wis., has changed its name to the NICHOL MACHINERY Co. This does not involve any change in management or location, and has been done merely to identify the company more closely with its product.

R. R. KEITH, manager of the Tractor Works of the J. I. Case Co., Racine, Wis., has been nominated vice-president in charge of the production activity of the Society of Automotive Engineers for the year 1937.

* * *

Factory shipments by members of the Automobile Manufacturers Association during the first nine months of this year amounted to 2,561,905 cars and trucks. The members of the Association include all the important automobile manufacturers, with the exception of the Ford Motor Co. This production is 26 per cent above that of last year and 72 per cent above the average for the last five years.

COMING EVENTS

NOVEMBER 10—Monthly evening meeting of the Hudson River Valley Division of the SPECIAL TOOL, DIE, and MACHINE SHOP INSTITUTE, INC., at the Hotel Pennsylvania, New York City. Sidney Diamant, president, 401 Mulberry St., Newark, N. J.

NOVEMBER 11-12—Annual convention of the PACKAGING MACHINERY MANUFACTURERS INSTITUTE, INC., at the Edgewater Beach Hotel, Chicago, Ill. H. L. Stratton, secretary, 342 Madison Ave., New York City.

NOVEMBER 11-18—NATIONAL AUTOMOBILE SHOW, Grand Central Palace, New York City. Alfred Reeves, manager, 366 Madison Ave., New York City.

NOVEMBER 12-13—CONFERENCE ON MARKETING under the auspices of the American Management Association at the Hotel Pennsylvania, New York City. Alvin E. Dodd, president, American Management Association, 330 W. 42nd St., New York City.

NOVEMBER 18-20—NATIONAL FOREIGN TRADE CONVENTION at Chicago, Ill. For further information, address National Foreign Trade Council, 26 Beaver St., New York City.

NOVEMBER 18-20—Thirty-seventh annual convention of the INTERNATIONAL ACETYLENE ASSOCIATION to be held at the Jefferson Hotel, St. Louis, Mo. Office of the Association, 30 E. 42nd St., New York City.

NOVEMBER 30-DECEMBER 4—Annual meeting of the AMERICAN SOCIETY OF MECHANICAL ENGINEERS in New York City. C. E. Davies, secretary, 29 W. 39th St., New York City.

NOVEMBER 30-DECEMBER 5—NATIONAL EXPOSITION OF POWER AND MECHANICAL ENGINEERING to be held at the Grand Central Palace, New York City. For further information, address Charles F. Roth, manager, Grand Central Palace, New York City.

DECEMBER 5—Fall meeting of the Middle Atlantic Section of the Society for the Promotion of Engineering Education at Columbia University, New York City. Frank L. Eldmann, chairman of the Middle Atlantic Section, Columbia University, New York City.

FEBRUARY 15-26, 1937—BRITISH INDUSTRIES FAIR to be held in London and Birmingham, England. Further information may be obtained from the Travel and Industrial Development Association of Great Britain and Ireland, British Empire Bldg., Rockefeller Center, New York City.

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OBITUARIES

Harold C. Smith

Harold Cornelius Smith, president of the Illinois Tool Works, Chicago, Ill., and long prominent in the machinery and manufacturing industries, died of pneumonia at St. Luke's Hospital in Chicago on September 28, at the age of fifty-four years. Mr. Smith was born in Chicago on September 19, 1882. He grad-



Koehne Photo

Harold C. Smith

uated from Princeton University in 1904, and had been president of the Illinois Tool Works since 1915. He was also a director of the Northern Trust Co. of Chicago.

He served as director of the Illinois Manufacturers' Association from 1930 to 1935 and was also a director of the National Association of Manufacturers in 1935. He was a member of the Industrial Advisory Board of the National Recovery Administration from October, 1934, to May, 1935. From June, 1934, to June, 1935, he served on the Business Advisory and Planning Council of the Department of Commerce and was also a member of the Executive Committee. He is survived by his widow and four children.

Samuel Montgomery Kintner

Dr. Samuel Montgomery Kintner, vice-president in charge of engineering of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and internationally known in the engineering world for his research work and pioneering in the development of radio communication and broadcasting, died at his home in Pittsburgh, Pa., on September 28.

Dr. Kintner was born in New Albany,

Ind., on December 11, 1871. He received his technical education at Purdue University, from which he graduated in 1894 with the degree of Electrical Engineer. After spending a year on telephone construction and operation, he taught engineering and mathematics at the Western University of Pennsylvania. During that period he did considerable research work. In 1903 he became associated with the research department of the Westinghouse Electric & Mfg. Co. Later he was made design engineer and was responsible for the design of the motors employed on the New Haven Railway, St. Clair Tunnel, and many other important installations.

In 1911 he resigned from the Westinghouse organization to become the general manager of the National Signaling Co. and then engaged in developing inventions related to radio. He later became president of the company. Some time after the war he again became connected with the Westinghouse Electric & Mfg. Co. and was appointed manager of the research department.

Dr. Kintner was presented with the honorary degree of Doctor of Science by the University of Pittsburgh and with the honorary degree of Doctor of Engineering by Purdue University.

FRED D. KENNEDY, who has been connected with the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., in various executive capacities for nearly forty-five years, died in the Homeopathic

Hospital on September 28. Mr. Kennedy was born in Burgettstown, Pa., on January 20, 1870, and learned his trade as a machinist with the Morgan Engineering Co. of Alliance, Ohio. He entered the employ of the Westinghouse organization in January, 1893. At first he was engaged in installing electrical machinery in power stations. Later he was made superintendent of railway motor and locomotive work and was closely identified with important railroad installations. He was an authority on the mechanical details of railway and locomotive equipment, and as such has more recently been attached to the staff of the general works manager in a consulting capacity.

HENRY ELLSWORTH MORTON, president of the Morton Mfg. Co., died at his home in Muskegon Heights, Mich., on September 29, aged seventy-three years. Mr. Morton had spent fifty-eight years of his life in building up the Morton Mfg. Co. and developing its line of Draw-Cut machine tools. He had an exceptionally wide acquaintance throughout the industrial and railroad world and contributed largely to the solution of problems in shaping, planing, keyseating and trimming.

WILLIAM ROBERTSON, founder and president of the W. Robertson Machine & Foundry Co., Inc., Buffalo, N. Y., died on September 26 at the age of seventy-three years. Mr. Robertson was a pioneer in the power hacksaw industry.

NEW BOOKS AND PUBLICATIONS

HANDBOOK OF ENGINEERING FUNDAMENTALS. Edited by Ovid W. Eshbach. 1081 pages, 6 by 9 inches. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York City. Price, \$5.

This is the first volume in a proposed new series of engineering handbooks. The field dealt with in the new volume covers mathematics, physics, and chemistry, and the data collected is the combined work of forty different contributors. The aim has been to present in one volume a complete summary of the facts pertaining to the fundamental theory underlying engineering practice.

The book is divided into thirteen sections dealing with the following subjects: Mathematical and Physical Tables; Mathematics; Physical Units and Standards; Theoretical Mechanics; Mechanics of Materials; Mechanics of Fluids; Engineering Thermo-dynamics; Electricity and Magnetism; Radiation and Light, Acoustics, and Meteorology; Chemistry; Metallic Materials; Non-Metallic Materials; and Contracts.

THE STEEL PHYSICAL PROPERTIES ATLAS. By Charles Newman Dawe. 90 pages, 8 1/2 by 11 inches. Published by the American Society for Metals, 7016 Euclid Ave., Cleveland, Ohio. Price, \$2.50.

This book was prepared to fill an outstanding need for a compilation of authoritative physical test data for the various types of plain carbon and alloy steels. It contains thirty-five large, easily read graphs showing the physical properties of the most generally used steels and steel castings, as affected by carbon content, alloy content, heat-treatment, and other factors. Many of the graphs are printed in three colors, so that the properties of the steels under different conditions can be seen at a glance. This book should prove of considerable value to engineers, metallurgists, chemists, designers, and others engaged in the use of steels, as it provides a compact rapid reference to the physical properties of SAE steels, cast steels, plates, rounds, 18-8 stainless steels, and some high-tensile strength steels.

NEWS OF THE INDUSTRY

California and Oregon

CHAIN BELT Co., Milwaukee, Wis., has appointed B. E. SIVYER, JR., branch manager of the company's San Francisco office to succeed the late G. E. Taylor. The San Francisco office of the company is at 366 Brannan St. The company also announces that its Portland, Ore., office has been moved from 215 S.W. First Ave. to 112-118 S.W. First Ave.

France

M. ROSE, associate editor of the publication *La Machine Moderne* of Paris, the leading French publication in the machine tool field, is spending a month in the United States with the object of obtaining first-hand information relating to recent developments in the American machine tool industry for use in a special number on American machine tools which *La Machine Moderne* proposes to publish in the near future. Mail may be addressed to him in care of MACHINERY, 148 Lafayette St., New York City.

Illinois

LOUIS KUEHN and A. J. LUEDKE, of the Milcor Steel Co., a subsidiary of the Inland Steel Co., First National Bank Bldg., Chicago, Ill., were elected mem-

bers of the board of directors of the Inland Steel Co. at a recent meeting. Mr. Kuehn has been president of the Milcor Steel Co. since its establishment in 1902. Mr. Luedke was previously connected with the Milwaukee Corrugating Co., of which he was secretary and treasurer.

PHIOLL MFG. Co., 5700 Roosevelt Road, Chicago, Ill., manufacturer of screws, bolts, and nuts, is constructing a two-story addition to its factory, 300 feet wide by 75 feet deep. The building is of reinforced concrete construction. The second floor of the addition will be occupied by the general offices, and the remainder of the building will be used for finished products and will also house the packing and shipping departments.

HAROLD BYRON SMITH was elected president of the Illinois Tool Works, 2501 N. Keeler Ave., Chicago, Ill., at the last meeting of the board of directors, to succeed his father, the late Harold C. Smith. At the same time CALMER L. JOHNSON, secretary of the company, was elected treasurer.

CHARLES A. KROPP, president of the Kropp Forge Co., 5400 Roosevelt Road, Chicago, Ill., has resigned, and ROY A. KROPP has been elected to succeed him. Charles A. Kropp will continue his active connection with the company as chairman of the board of directors.

DETROIT BROACH Co., INC., 6000 Beniteau Ave., Detroit, Mich., has appointed F. G. JACKSON direct representative of



F. G. Jackson, Representative in Chicago of the Detroit Broach Co.

the company in the Chicago territory, with offices at 1717 Daily News Bldg., 400 W. Madison St., Chicago, Ill.

ZEH & HAHNEMANN Co., 182 Vanderpool St., Newark, N. J., has appointed P. P. WAGENER, 1714 Walnut Ave., Wilmette, Ill., representative in the Midwest.

Indiana and Michigan

S. R. THOMAS has been appointed manager of the Automotive Bearing Division of the Bantam Ball Bearing Co., South Bend, Ind. Mr. Thomas has been associated with the automotive industry for the last twenty-two years, having been connected, among other companies, with the General Motors Corporation in important engineering positions.



Louis Kuehn, Newly Elected Director of the Inland Steel Company



A. J. Luedke, Another New Director of the Inland Steel Company



S. R. Thomas, Manager, Automotive Bearing Division, Bantam Ball Bearing Co.

H. W. SCHMID, 1955 Ruckle St., Indianapolis, Ind., has been appointed representative of the Ohio Electric Mfg. Co., Cleveland, Ohio, for the sale of Ohio motors in the Indianapolis territory.

THOR M. OLSON has been appointed sales manager of the Ex-Cell-O Aircraft & Tool Corporation, Detroit, Mich., succeeding WILLIAM F. WISE. Mr. Olson was general manager of the Continental Tool Works from the time it was founded until shortly before it was acquired by the Ex-Cell-O Aircraft & Tool Corporation in 1930. During the latter part of that period he held the position of president. After becoming associated with the Ex-Cell-O organization, Mr. Olson was made vice-president and a director, in which capacity he took an active part in sales work. He has an excellent mechanical background gained through his many manufacturing activities.

New England

ALDUS C. HIGGINS, president and general manager of the Norton Co., Worcester, Mass., recently returned from a visit to England and France. He states



Aldus C. Higgins, President and General Manager of the Norton Co.

that he found business conditions in England very satisfactory and that British business is moving forward in a conservative yet progressive manner. The business situation in France he found more confused, because of the unsettled political and monetary situation.

LEEDS & NORTHRUP Co., 4921 Stenton Ave., Philadelphia, Pa., announces the opening of a new branch office located at 804 Judd Bldg., 75 Pearl St., Hartford, Conn.

New York and New Jersey

BRYANT MACHINERY & ENGINEERING Co., 400 W. Madison St., Chicago, Ill., general distributor for the Cleereman Machine Tool Co., Green Bay, Wis., announces the appointment of the following exclusive agents to handle Cleereman drilling machines and tool-room lay-out machines: J. F. OWENS MACHINERY Co., 1029 State Tower Bldg., Syracuse, N. Y.; F. W. SCHIEFER MACHINERY Co., 404 Ellwanger and Barry Bldg., Rochester, N. Y.

DR. D. S. JACOBUS, head of the engineering department of the Babcock & Wilcox Co., New York City, has been awarded the Morehead medal for 1935 for his outstanding leadership in the formulation of codes and procedures for the application of fusion welding. The medal was presented to Dr. Jacobus at the thirty-seventh annual convention of the International Acetylene Association in St. Louis on November 18.

HENRY METCALF HOBART, prominently identified with welding research, has been awarded the Samuel Wylie Miller medal by the American Welding Society. Mr. Hobart has been connected with the General Electric Co. as an engineer from 1895 to 1900, and as consulting engineer since 1911. He carried on a consulting engineering practice in London between 1903 and 1911.

C. F. BOLLES, after thirteen years of experience with the Public Service Electric & Gas Co. of New Jersey in the design and construction of outdoor switching and sub-stations, has joined the New York office of the Delta-Star Electric Co., 2400 Block, Fulton St., Chicago, Ill., in the capacity of sales engineer.

JOHN W. WHITE, formerly managing director of the Cia. Westinghouse Electric Internacional, S. A., with headquarters at Buenos Aires, Argentina, has been appointed general manager of the Westinghouse Electric International Co. He will make his headquarters at 150 Broadway, New York City.

NEWARK WIRE CLOTH Co., Newark, N. J., manufacturer of woven wire screens and wire cloth products, announces the following changes in its sales organization: HARRY G. MOUAT has been appointed representative of the company in the Birmingham territory, with headquarters in the Martin Bldg., Birmingham, Ala.; W. C. MYERS & Co., 8 N. Cheyenne St., Tulsa, Okla., have been appointed representatives in the Tulsa territory. The Pittsburgh office has been discontinued.

Ohio

STEEL & TUBES, INC., a subsidiary of the Republic Steel Corporation, Cleveland, Ohio, announces the following appointments in the sales department:

LEE M. HOGAN, former manager of advertising and sales promotion, has been made district sales manager of the New York district. IRVING WHITEHOUSE, former assistant manager, has been appointed manager of sales promotion. A. R. SMITH, who has been superintendent of the Elyria division of the company, was promoted to the position of general manager of that division upon the retirement of A. E. ADAMS.

D. M. PATTISON, sales engineer for the Warner & Swasey Co. in Chicago during the last six years, has been appointed



D. M. Pattison, Manager of Cleveland Sales Territory of Warner & Swasey Co.

manager of the company's Cleveland sales territory. Mr. Pattison joined the Warner & Swasey Co. as a special apprentice in 1928. After spending several years in the company's tool design department, he joined the sales organization.

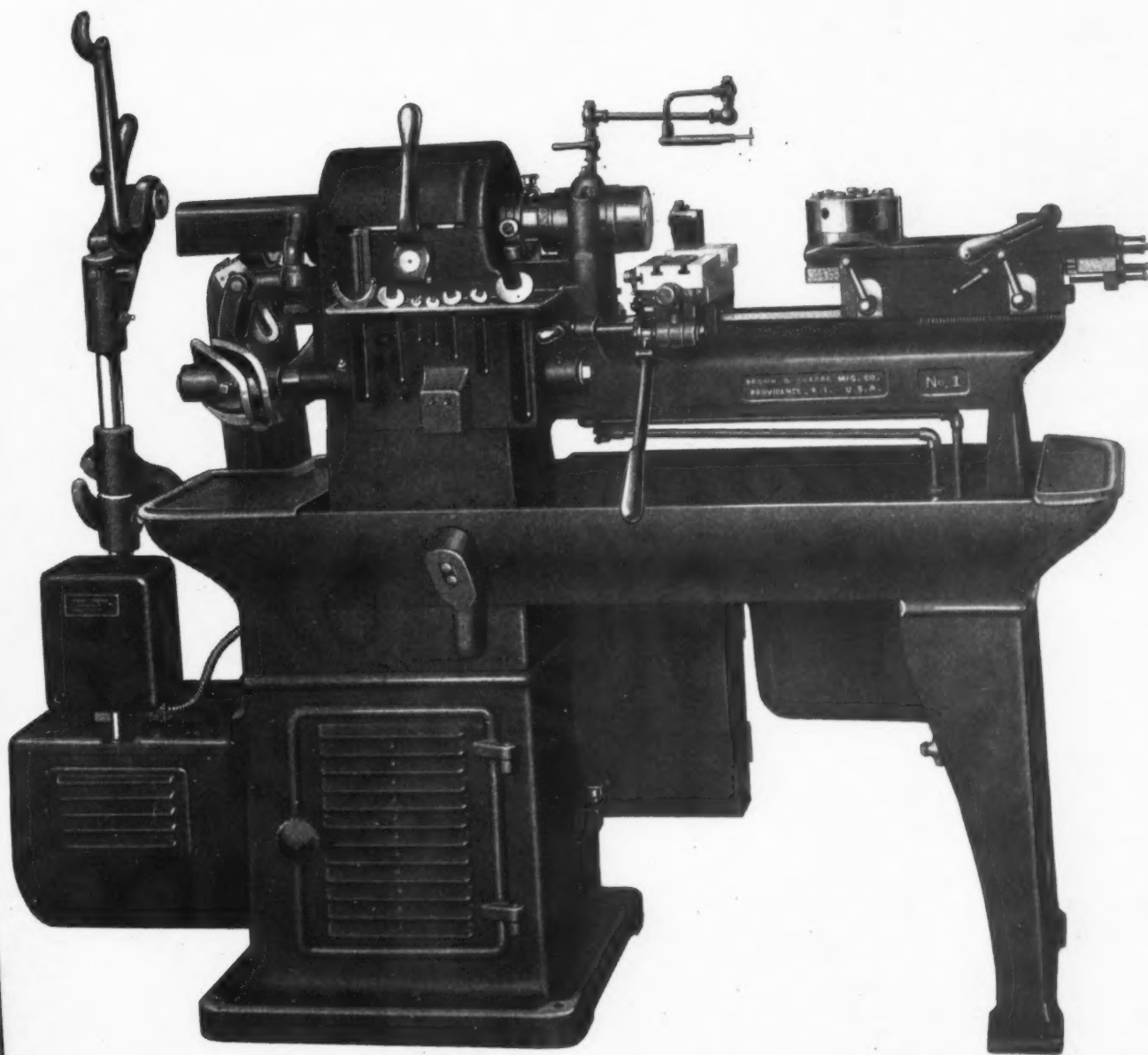
WEATHERHEAD Co., 620-724 Frankfort Ave., Cleveland, Ohio, manufacturer of automobile and refrigerator parts, recently announced the purchase of the former Hupmobile plant in that city, which affords greatly increased manufacturing facilities. The site of the plant is at E. 131st St., Cleveland.

R. H. SONNEBORN has been made assistant manager of sales of the Pipe Division of the Republic Steel Corporation, Cleveland, Ohio, succeeding CHARLES W. EAST, district manager of the Houston district.

EASTON CAR & CONSTRUCTION Co., Easton, Pa., announces the appointment of the H. B. FULLER EQUIPMENT Co. as agent in the Cleveland territory.

H. A. WOOFER has recently become associated with the Federal Machine & Welder Co., of Warren, Ohio, as chief engineer.

For Your Short Runs — and Second Operations



The New Design

Nos. 0 and 1 BROWN & SHARPE MOTOR DRIVEN WIRE FEED SCREW MACHINES

— NEW FEATURES

Ask for details — either
Belt or Motor-Driven
Brown & Sharpe Mfg. Co.
Providence, R. I., U. S. A.

Most Manufacturers can **profitably** use these Modern Design Semi-Automatic Wire Feed Type Screw Machines for Short Run Jobs — and for Second Operations on work from their "Automatics".



Martin L. Hopkins, Assistant Manager of Sales, Bolt and Nut Division, Republic Steel Corporation

MARTIN L. HOPKINS has been promoted to the position of assistant manager of sales of the Bolt and Nut Division of the Republic Steel Corporation, Cleveland, Ohio. FRANK P. McEWEN will continue as the other assistant in this division. Mr. Hopkins has had wide experience in bolt and nut manufacture.

Pennsylvania

LELAND D. O'CONNELL has been appointed manager of the Denver, Col., office of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. He has been connected with the Westinghouse organization since 1919, when he entered the apprenticeship course. Recently he has been manager of welding activities. WILLIAM TRUDGIAN, former manager of the Denver office, has been promoted to the post of special representative and will assume the duties previously handled by L. M. CARGO, who has retired.

DAVID S. YOUNGHOLM was elected vice-president of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., at the last meeting of the board of directors. He will make his headquarters in New York. Mr. Youngholm joined the Westinghouse organization twenty-seven years ago.

Wisconsin

STEARNS MAGNETIC MFG. Co., Milwaukee, Wis., has appointed the S. O. OTRICH Co., 119 New Montgomery St., San Francisco, Calif., sales representative for the Stearns line of magnetic separators, clutches, brakes, and other magnetic

equipment. The company also announces the opening of a sales office in Philadelphia at 369 Architects Building, with JAMES WHITING in charge.

MAGNETIC MFG. Co., 675 S. 28th St., Milwaukee, Wis., has changed its name to the STEARNS MAGNETIC MFG. Co. This does not involve any change in corporate structure, management, or plant location.

FREDERICK SALDITT has been appointed vice-president of the Harnischfeger Corporation, Milwaukee, Wis., manufacturer of cranes, hoists, welders, motors, and generators. Mr. Salditt has been with the company for over thirteen years. As export manager, he has traveled extensively in foreign markets.



Frederick Salditt, New Vice-President of Harnischfeger Corporation

In addition to his duties as vice-president, he will continue to retain supervision of foreign operations.

OBITUARY

JAMES DONOVAN WIGGLESWORTH, of Winnetka, Ill., secretary of the Hill-Clarke Machinery Co. of Chicago, Ill., with whom he had been associated since 1922, died at the Evanston Hospital, October 26, after a brief illness. Mr. Wigglesworth received his education at Lake Forest Academy and at Cornell University, where he enlisted in the Students' Army Training Corps. Following the war, he attended Purdue University. He is survived by his wife and three children.

COMING EVENTS

NOVEMBER 30-DECEMBER 4—Annual meeting of the AMERICAN SOCIETY OF MECHANICAL ENGINEERS in New York City. C. E. Davies, secretary, 29 W. 39th St., New York City.

NOVEMBER 30-DECEMBER 5—NATIONAL EXPOSITION OF POWER AND MECHANICAL ENGINEERING to be held at the Grand Central Palace, New York City. For further information, address Charles F. Roth, manager, Grand Central Palace, New York City.

DECEMBER 5—Fall meeting of the Middle Atlantic Section of the SOCIETY FOR THE PROMOTION OF ENGINEERING EDUCATION at Columbia University, New York City. Frank L. Eldmann, chairman of the Middle Atlantic Section, Columbia University, New York City.

DECEMBER 8—Monthly evening meeting of the Hudson River Valley Division of the SPECIAL TOOL, DIE AND MACHINE SHOP INSTITUTE, Inc., at the Hotel Pennsylvania, New York City. Sidney Diamant, president, 401 Mulberry St., Newark, N. J.

JANUARY 11-15, 1937—Annual meeting of the SOCIETY OF AUTOMOTIVE ENGINEERS at Detroit, Mich. John A. C. Warner, secretary and general manager, 29 W. 39th St., New York City.

FEBRUARY 15-26, 1937—BRITISH INDUSTRIES FAIR to be held in London and Birmingham, England. Further information may be obtained from the Travel and Industrial Development Association of Great Britain and Ireland, British Empire Bldg., Rockefeller Center, New York City.

FEBRUARY 28-MARCH 8, 1937—INTERNATIONAL INDUSTRIAL EXHIBITION (LEIPZIG TRADE FAIR) to be held at Leipzig, Germany. Further information may be obtained from the Leipzig Trade Fair, Inc., 10 E. 40th St., New York City.

APRIL 19-24, 1937—Second International Congress of the INTERNATIONAL ASSOCIATION FOR TESTING MATERIALS to be held in London, England. For further information, address K. Headlam-Morley, honorary secretary, 28 Victoria St., London, S. W. 1, England.

* * *

Out of every dollar of operating income received by the railroads of the United States, approximately 8 cents goes for taxes. It is estimated that 1,600,000 children are being educated in communities through which the railroads pass by the money paid in taxes by the railroads.

The
ARISTOCRAT
of Bearings



FIRST CHOICE
OF
AMERICA'S LEADING MACHINE BUILDERS

HOOPER
BALL *and* BEARING CO.

A N N A R B O R . . . M I C H I G A N

NEW BOOKS AND PUBLICATIONS

PROCEDURE HANDBOOK OF ARC WELDING DESIGN AND PRACTICE. 819 pages, 5 3/4 by 9 inches. Published by the Lincoln Electric Co., Cleveland, Ohio. Price, \$1.50. (Outside of the United States, \$2.)

This is the fourth edition of a handbook on arc welding. The present edition contains 223 added pages of new arc welding data and 289 new illustrations. The new material includes complete information on the following subjects: Characteristics of the Welding Generator; Selection of Type of Joint; Insurance of Fusion Welded Vessels; Welding Codes; Arc Cutting; Polarity of Welding Current; Horizontal Welds; Sheet Metal Welding; Effect of Electrode Size on Welding Cost; Methods of Testing Weld Metals; 4-6 Chrome Steel; Monel Metal; Principles of Surfacing by Welding; Welded Design Begins with Standard Shapes and Plates; and Plate Girders. In addition to containing new material, the Handbook has been thoroughly revised and brought up to date to include the latest developments in arc-welding practice.

The eight sections of the book are as follows: Welding Methods and Equipment; Technique of Welding; Procedure, Speeds, and Costs for Welding Mild Steel; Structure and Properties of Weld Metal; Weldability of Metals; Designing for Arc-Welded Steel Construction of Machinery; Designing for Arc-Welded Structures; and Typical Applications of Arc Welding in Manufacturing, Construction, and Maintenance.

AN IMPROVED METHOD FOR PREPARING CAST-IRON TRANSVERSE TEST BARS. By A. I. Krynsky and C. M. Saeger, Jr. 16 pages, 6 by 9 inches. Published by the U. S. Department of Commerce, Washington, D. C., as Research Paper RP880 of the National Bureau of Standards. Price, 5 cents.

PLANNING FOR TAX ECONOMY. By William H. Crow and U. S. Greene. 1088 pages, 6 by 9 1/4 inches. Published by Waldrep-Tilson, Inc., 565 Fifth Ave., New York. Price, \$7.50.

With the increasing complexity and importance of tax laws, federal, state, and local, there is a vital need for a book that covers the subject of management of personal and business affairs with an intelligent view to tax results. This phase of taxes has been treated in the past in an incidental manner, probably due to the fact that taxes have changed so rapidly that it has been difficult to establish definite formulas for tax planning. The authors of this book, recognizing the difficulties of making long-range plans, have attempted to present methods of approach to such problems rather than to lay down rules that would cease to be applicable in the event of changes in the law. Many years of varied experience on the part of the authors, supplemented by exhaustive studies of actual cases, have been drawn upon in preparing the discussions and illustrative cases. The reader will find in this book many definite suggestions for permissible tax savings and the

avoidance of costly mistakes in dealing with property, organizing and conducting a business, financing, purchasing, selling, manufacturing, obtaining credits, and arranging mergers.

MECHANICAL CATALOG (1936-1937). 383 pages, 8 1/2 by 11 1/4 inches. Published by the American Society of Mechanical Engineers, 29 W. 39th St., New York City.

This is the twenty-sixth edition of a collection of mechanical catalogs covering industrial equipment, materials, and supplies. The contents consist of specification data on hundreds of items produced by several hundred manufacturers, thoroughly indexed and cross-indexed. With this system, catalog information is more easily accessible than with the individual catalog system.

The book is divided into three parts, the first of which covers the catalog material and gives a detailed description of the various products. A new feature of the present edition is the classified catalog index which is provided at the beginning of the catalog section and comprises a list of the products described, classified according to product. The second section of the book contains a classified index to manufacturers, and gives the names and addresses of the manufacturers whose catalogs are presented, as well as a large number of additional concerns serving the mechanical engineering field, arranged according to product. The third section contains an alphabetical list of the firms, with their addresses, whose products are indexed in the volume.

THE AMERICAN ECONOMIC SYSTEM COMPARED WITH COLLECTIVISM AND DICTATORSHIP. 36 pages, 6 by 9 inches. Published by the Chamber of Commerce of the United States, Washington, D. C.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933,

of MACHINERY, published monthly at New York, N. Y., for October 1, 1936.

State of New York)
County of New York) ss.

Before me, a Notary Public, in and for the state and county aforesaid, personally appeared Edgar A. Becker, who having been duly sworn according to law, deposes and says that he is the treasurer of The Industrial Press, Publishers of MACHINERY, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, The Industrial Press, 140-148 Lafayette St., New York; Editor, Erik Oberg, 140-148 Lafayette St., New York; Managing Editor, None; Business Managers, Robert B. Luchars, 140-148 Lafayette St., New York; Edgar A. Becker, 140-148 Lafayette St., New York; and Erik Oberg, 140-148 Lafayette St., New York.

2. That the owners of 1 per cent or more of the total amount of stock are: The Industrial Press, 140-148 Lafayette St., New York; Louis Pelletier, 140-148 Lafayette St., New York; Erik Oberg, 140-148 Lafayette St., New York; Robert B. Luchars, 140-148 Lafayette St., New York; Edgar A. Becker, 140-148 Lafayette St., New York; Laura

A. Brownell, 140-148 Lafayette St., New York; Franklin D. Jones, 140-148 Lafayette St., New York; Elizabeth Y. Urban, 163 Western Drive, Longmeadow, Mass.; and Helen L. Ketchum, Atlantic Ave., Cohasset, Mass.

3. That there are no bondholders, mortgagees, or other security holders.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder, or security holder, appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

EDGAR A. BECKER, Treasurer

Sworn to and subscribed before me this 22nd day of September, 1936

CHARLES P. ABEL,

Notary Public, Kings County No. 250
Kings Registers No. 7079

(SEAL)

New York County No. 155, New York Register's No. 7-A-89
(My commission expires March 30, 1937)

NEWS OF THE INDUSTRY

Illinois and Indiana

SHAFFER BEARING CORPORATION, manufacturer of roller bearings, has moved the general offices of the company to 35 E. Wacker Drive, Chicago, Ill. The company is also establishing a Chicago district sales office at 545 W. Washington Blvd., where a complete stock of Shafer radial-thrust roller bearings and mounted bearing units for industrial power transmission and other applications will be maintained.

DR. W. C. BALKE, director of research of the Fansteel Metallurgical Corporation and the Vascoloy-Ramet Corporation, North Chicago, Ill., spoke on the subject of "Refractory Metals and the Uses of their Carbides in Tool Material" before the Superintendents and Foremen's Club of the Chicago branch of the National Metal Trades Association on December 12, at the Hotel Sherman in Chicago.

ARTHUR NEWELL TALBOT, professor emeritus of engineering in the University of Illinois, has been awarded the 1937 John Fritz gold medal by the national societies of civil, mining and metallurgical, mechanical, and electrical engineers, as a "molder of men, eminent consultant on engineering projects, leader of research, and outstanding educator in civil engineering."

R. H. SORGE has been appointed sales manager of the Western Bearings Co., 3012 Calumet Ave., Chicago, Ill. He will make his headquarters at Chicago. Mr. Sorge was formerly connected with the Milwaukee headquarters of the company and has been associated with the anti-friction bearing field for nine years.

LINDBERG ENGINEERING Co., 221 Union Park Court, Chicago, Ill., announces the opening of two new sales offices, one at 90 West Broadway, New York City, and the other at 503 Illinois Bldg., Indianapolis, Ind. LAWRENCE W. HAYDEN will be manager of the New York office.

SUPER TOOL Co., 356 E. Congress St., Detroit, Mich., manufacturer of refractory carbide metals and tools, announces the removal of its Chicago offices to 656 Washington Blvd. HARRY BECK has been appointed district sales manager.

GRANT GOODWIN, 503 Illinois Bldg., Indianapolis, Ind., is now associated with the Lindberg Engineering Co. as district manager of the Indiana and southern Illinois territory. Mr. Goodwin was formerly metallurgist of the Muehlhausen Spring Co., Logansport, Ind.

Massachusetts

GEORGE C. EWING has been appointed New England representative, with sales office at 10 High St., Boston, Mass., of the AJAX FLEXIBLE COUPLING Co., Westfield, N. Y. Mr. Ewing will handle the complete line of Ajax flexible couplings and the new Ajax reciprocating drive for screens, conveyors, etc.

MACKENZIE MACHINERY Co., 25 Huntington Ave., Boston, Mass., has been appointed exclusive representative in the Boston territory for the SOUTH BEND LATHE WORKS, South Bend, Ind.

Michigan and Wisconsin

GENERAL GEAR Co., 2930 E. Canfield Ave., Detroit, Mich., of which F. A. Bernstein is president and owner, announces that, in addition to the manufacture of gears, the company is now also specializing in work requiring broaching.

JOHN T. BROWN, formerly works manager of the Chain Belt Co., Milwaukee, Wis., manufacturer of Rex chain, conveyors, construction machinery, etc., was elected vice-president of the company at a recent meeting of the board of directors.

C. J. FECHHEIMER has recently joined the engineering staff of the Louis Allis Co., Milwaukee, Wis., manufacturer of electric motors, in the capacity of consulting engineer.

New Jersey

SHOLES, INC., Orange, N. J., manufacturer of Orange heavy-duty staggered roller radial bearings, heavy-duty staggered roller thrust bearings, tapered roller bearings, and needle roller bearings, has changed its incorporated name to the ROLLER BEARING Co., INC. The new officers are James A. Burden, president; C. L. Ritchie, vice-president and general manager; John M. Forrest, treasurer; Thomas R. Forsbrey, assistant treasurer; and A. E. Schaeffner, secretary.

GERALD R. BROPHY has joined the development and research staff of the International Nickel Co., Inc., 67 Wall St., New York City. He will be located at the research laboratory of the company at Bayonne, N. J., and will devote his time to research problems relating to

nickel alloy steels, nickel cast irons, and other ferrous materials.

H. O. BATES, 966 Carteret Ave., Union, N. J., announces that he is now engaged in manufacturing industrial marking devices for trademarking, name printing, embossing, or numbering, and is also prepared to offer consulting service in this field. Mr. Bates has had thirteen years of experience in this class of work.

MAGNUS CHEMICAL Co., Garwood, N. J., manufacturer of cleaning materials and lubricants, announces the appointment of the following sales representatives: LEON SMITH, state of Maine; WILLIAM REIN, southern part of Florida; ARTHUR ECKHARDT, state of Texas.

J. A. ARMSTRONG, formerly plant superintendent of the Reynolds Corporation, Kearny, N. J., has recently been made president of the Welding Timer Mfg., Inc., 251 Ogden St., Newark, N. J. Dr. Paul G. Weiller continues as treasurer.

WILLIAM J. JOCKERS has been appointed assistant sales manager of the Diehl Mfg. Co., Electrical Division of the Singer Mfg. Co., Elizabethport, N. J.

New York

DR. EDWARD BAUSCH, of the Bausch & Lomb Optical Co., Rochester, N. Y., was awarded the A.S.M.E. Medal on December 1, which is bestowed annually by the American Society of Mechanical Engineers "for great and unique acts of an engineering nature that have accomplished a great and timely benefit to the public." In his long and notable career, which began with the construction of his first microscope in 1872, Dr. Bausch has been a constant contributor to engineering progress, which is partially indicated by some forty patents. At eighty-three years of age, he is still on the job every day, assisting his associates in the solution of difficult problems. His most recent development is the contour measuring projector, a new type of inspection device.

H. BOKER & Co., of New York City, sales representatives for specialty steels, have acquired all the rights to Kinite alloy die steel, including the patents, good will, trade name, and stock. Kinite will be available, as heretofore, both in bars and in castings. In addition, the firm will continue to handle Novo Superior high-speed tool steel and a number of other steel specialties.

D. L. MATHIAS has joined the staff of the Metal & Thermit Corporation, 120 Broadway, New York City, in the capacity of research engineer. He was previously connected with the research laboratories of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

PROGRESSIVE

▲ *No. 10 Plain Milling Machine*

—a new **electrically controlled** production unit for the rapid manufacture of small parts, combining many of the proved design features of the successful new design No. 12 Plain Milling Machine... and many advanced construction features of the increasingly popular "Light Type."

▲ *No. 0 Omniversal Milling Machine*

—redesigned to incorporate an omniversal milling head that can be used on the side of the machine or in either of the overarm locations—**added** versatility for this unique machine tool.

▲ *No. 2 Wire Feed Screw Machines, Motor Driven and Overhead Driven*

—new in design with new features that make these semi-automatic machines more profitable on short runs or second operations, due to higher spindle speeds—broader range of work—high ratio between high and low speeds.

▲ *No. 00 Automatic Screw, Turret Forming and Cutting-Off Machines*

—redesigned to provide for increased spindle speeds to 6000 R.P.M. and increased capacity to $\frac{3}{8}$ " dia. ($\frac{1}{2}$ " for light work), giving maximum production regardless of the material.

DEVELOPMENTS during 1936—

▲ *No. 20 Plain Grinding Machine* (10" x 18")

—a new production grinder employing proved design principles of **electrical control** in a sturdy machine, giving increased productive capacity and more closely controlled accuracy.

▲ *No. 22 Plain Grinding Machine* (10" x 36")

—another new production grinder, similar to the No. 20, but of larger capacity in length.

▲ *No. 10 Cutter and Tool Grinding Machine*

—a new **advanced design** motor driven machine. Reduced height and convenient location of controls enable cut to be watched from a single operating position.



May we send detailed information on these progressive developments in modern machine tools?
Brown & Sharpe Mfg. Co., Providence, R. I., U. S. A.

SHARPE

Ohio

ARTHUR R. FORS has been appointed works manager of Airtemp, Inc., a subsidiary of the Chrysler Corporation, Dayton, Ohio. Mr. Fors has been identified with the Chrysler Corporation for



Arthur R. Fors, Recently Appointed Works Manager of Airtemp, Inc.

several years in plant supervision, as well as supervision of production and manufacturing. He was previously general works manager with Continental Motors, having general supervision of all manufacturing of the Continental motor plants in Detroit, Grand Rapids, and Muskegon.

WILLIAM E. UMSTADT, president of the Timken Roller Bearing Co., Canton, Ohio, has been elected president of the Timken Steel & Tube Co., a subsidiary of the former company. H. H. TIMKEN, JR., previously a vice-president of the Timken Steel & Tube Co., has been made executive vice-president of that company and will continue to serve as vice-president and director of the Timken Roller Bearing Co. JOHN E. FICK has been appointed general superintendent of the steel and tube mills of the Timken Steel & Tube Co.

G. S. McKEE has been appointed general superintendent of the Globe-Wernicke Co.'s factory at Cincinnati, Ohio. Mr. McKee was previously head of the production engineering division of the Baldwin-Southwark Corporation, Philadelphia, Pa., a subsidiary of the Baldwin Locomotive Works.

ROTOR AIR TOOL Co., Cleveland, Ohio, announces that its expanding business in air tools and high-frequency electric tools has made additional space and improved facilities necessary. To meet

these requirements, the company is moving from 5704 Carnegie Ave. to 17325 Euclid Ave.

ESCO ENGINEERING SERVICE Co. has moved to larger quarters at 3120 Monroe St., Toledo, Ohio. Additional machinery is being installed to increase the company's capacity for general tool work and the production of the Esco drill jig.

J. PARKS HUTCHESON Co., 1900 Euclid Ave., Cleveland, Ohio, and 1120 Empire Bldg., Pittsburgh, Pa., has recently been appointed agent for the Welding Timer Mfg., Inc., 251 Ogden St., Newark, N. J.

COMING EVENTS

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MAY 2—Forty-first annual convention and exposition of the AMERICAN FOUNDRYMEN'S ASSOCIATION in Milwaukee, Wis. C. E. Hoyt, executive secretary-treasurer, 222 W. Adams St., Chicago, Ill.

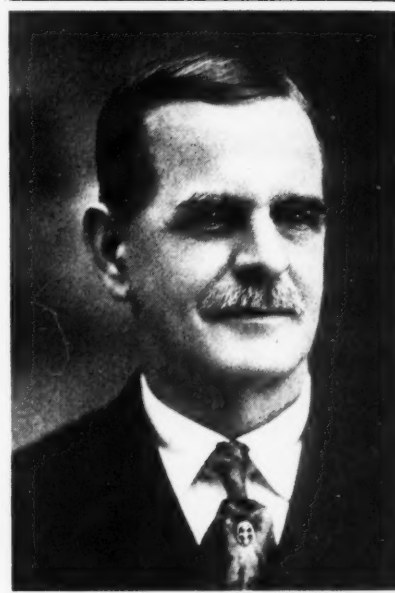
MAY 17-21—Spring meeting of the AMERICAN SOCIETY OF MECHANICAL ENGINEERS at Detroit, Mich., with headquarters at the Hotel Statler. C. E. Davies, secretary, 29 W. 39th St., New York City.

OCTOBER 18-22—NATIONAL METAL CONGRESS AND EXPOSITION to be held in the Atlantic City Auditorium, Atlantic City, N. J., under the auspices of the American Society for Metals, 7016 Euclid Ave., Cleveland, Ohio.

OBITUARIES

Alfred F. Cooke

Alfred F. Cooke, president of the Fawcus Machine Co. and president of the Schaffer Poidometer Co., died on November 27 at Pittsburgh from injuries resulting from an automobile accident. Mr. Cooke was a pioneer in the gear manufacturing industry, and his connection with the Fawcus Machine Co. and Gears & Forgings, Inc. (now the Ohio Forge & Machine Co.) extended over many years. He was a member of the American Gear Manufacturers' Association almost from its beginning, and



Alfred F. Cooke

served as president in 1928 and 1929. He was also a member of the National Metal Trades Association and was president of the Pittsburgh branch at the time of his death.

CARL HENRY LEIS, chief engineer and factory manager of the Johnson Bronze Co., New Castle, Pa., died at his home in New Castle on November 11, at the age of forty-five years. Mr. Leis was born in Germany and came to this country in 1917. He had been associated with the Johnson Bronze Co. since 1927. Mr. Leis was well known throughout engineering circles, where he was regarded as an authority on bearings and bearing bronze.

* * *

The automobile industry is the largest single consumer of steel, rubber, plate-glass, upholstery leather, and many other products.

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*The Season's Greetings to
All and grateful thanks to
our many customers who
have passed along the good
words in behalf of The
Aristocrat of Bearings.*

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•

MICHIGAN

NEW BOOKS AND PUBLICATIONS

BOOK OF A.S.T.M. STANDARDS (1936).

Published in two volumes with a total of 2400 pages, 6 by 9 inches. Published by the American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa. Price, cloth-bound, each part, \$7.50; both parts, \$14.

This triennial publication contains all the standard specifications, methods of test, recommended practices, and definitions adopted by the Society. Part I is devoted to metallic materials, and Part II to non-metallic materials. Of the 181 standards in Part I, 109 cover ferrous metals—steel, wrought iron, pig iron, ferro alloys, etc.—while 60 relate to non-ferrous metals, including aluminum and magnesium alloys, copper and copper alloys, lead, nickel, zinc, bearing metals, solder metal, deoxidizers, and electrical heating and electrical resistance alloys. Twelve of the standards involve metallography and general testing methods.

Included in the 335 standards in Part II are specifications and test methods covering many widely used non-metallic materials, among which may be mentioned: Electrical insulating materials; rubber products; waterproofing and roofing materials; paints and varnishes; refractories; textile materials; cement; concrete; coal; timber, etc.

KENT'S MECHANICAL ENGINEERS' HANDBOOK—PART I (POWER). Edited by Robert T. Kent and twenty-eight contributors. 1254 pages, 5 5/8 by 8 5/8 inches. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York City. Price, \$5.

This is the eleventh edition of Kent's well-known handbook for mechanical engineers. In the present edition, a revolutionary change has been made in the set-up of the book. The contents are now divided into two sections, one dealing with the entire field of power and its applications, and the other covering present-day methods in design and shop practice. Each section is published in a separate volume which may be purchased separately or in combination. The second volume will not be ready until the spring of 1937.

There are seventeen sections in the volume on power, covering the following subjects: Air; water; heat; combustion and fuels; steam; the steam boiler; the steam engine; the steam turbine; condensing and cooling equipment; refrigeration and ice making; heating, ventilating, and air-conditioning; internal combustion engines; gas producers; transportation; electric power; power test codes; and mathematical tables.

MECHANICAL POWER TRANSMISSION HANDBOOK.

By William Stanlar. 488 pages, 6 by 9 inches. Published by the McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York City. Price, \$5.

The object of this handbook, as stated in the preface, is to furnish definite and concise information to plant superintendents, plant maintenance and industrial engineers, mechanical designers, draftsmen, sales engineers, and students on the proper selection and application of mechanical power transmission equipment. The work has been divided into fifteen sections dealing with the following subjects: Power Belting; Fastening of Power Belting; Power Transmission by Belting; Flat Belt Pulleys; Steel Shafting; Bearings; Clutches, Couplings, Collars; Short-Center Driving Methods; Chain Driving; Mechanical Transmission Systems; High-Starting Torque Devices; Infinitely Variable Speed Control; Gear-Reduction Units; Lubrication of Mechanical Power Equipment; and Motors and Miscellaneous Data.

ENGINEERING AERODYNAMICS. By Walter Stuart Diehl. 556 pages, 6 by 9 inches. Published by the Ronald Press Co., 15 E. 26th St., New York City. Price, \$7.

This is the second edition of a book on the practical applications of aerodynamic theory to airplane design. In its present form, it is essentially a new book as the greater part of the text is now available for the first time. The author's aim has been to provide the designer and the advanced aeronautical student with concise practical information on the dynamics of airplane design. In preparing the volume, the author has analyzed a vast amount of test data and endeavored to present the essential conclusions in the form of equations, charts, and tables which may be used in solving hundreds of difficult problems. The book contains new data and methods on applied wing theory, control surface design, and performance calculation and estimation.

CONTROL OF ELECTRIC MOTORS. By P. B. Harwood. 390 pages, 6 by 9 inches. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York City. Price, \$4.50.

Inasmuch as thousands of electric motors are installed every year to drive machinery, a book on this subject should be of widespread interest. The object of the book, as stated in the preface, is to describe briefly the characteristics of various types of motors and to explain how these characteristics are used for control purposes. The design, construction,

and operating characteristics of a number of controllers and control devices are discussed, and methods of combining these devices to secure a desired result are described. Problems frequently encountered, such as motor acceleration, dynamic braking, and resistor design, are discussed in detail.

BROWN FLOW METER ENGINEERING HANDBOOK. 164 pages. Published by the Brown Instrument Co., Philadelphia, Pa. Price, \$2.

This handbook on flow meter engineering covers all types of fluid measuring equipment using the orifice. The subjects included are general flow meter engineering; orifice design; steam flow measurement; water flow measurement; liquid flow measurement; and air and gas flow measurement.

DETERMINATION OF THE BRINELL NUMBER OF METALS. By Serge N. Petrenko, Walter Ramberg, and Bruce Wilson. 37 pages, 6 by 9 inches. Published by the United States Department of Commerce, Washington, D. C., as Research Paper RP903 of the Bureau of Standards. Price, 5 cents.

SYMPOSIUM ON HIGH-STRENGTH CONSTRUCTIONAL METALS. 126 pages, 6 by 9 inches. Published by the American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa. Price, paper-bound, \$1.25; cloth-bound, \$1.50.

STRENGTH AND ELASTIC PROPERTIES OF CAST IRON. By W. J. Schlick and Bernard A. Moore. 95 pages, 6 by 9 inches. Published by the Iowa State College of Agriculture and Mechanic Arts, Ames, Iowa, as Bulletin 127 of the Engineering Experiment Station. Available without charge.

ABRASIVE GRAIN SIZES 11 pages, 6 by 9 inches. Published by the United States Department of Commerce, Washington, D. C., as Simplified Practice Recommendation R118-36 of the Bureau of Standards. Price, 5 cents.

CALENDARS RECEIVED

NEW DEPARTURE DIVISION OF GENERAL MOTORS, Bristol, Conn.

LINK-BELT Co., 307 N. Michigan Ave., Chicago, Ill.

GENERAL ELECTRIC Co., Schenectady, N. Y.

UNITED ENGINEERING & FOUNDRY Co., Pittsburgh, Pa.

CINCINNATI MILLING MACHINE Co., and CINCINNATI GRINDERS, INC., Cincinnati, Ohio.

NEW BOOKS AND PUBLICATIONS

LESSONS IN ARC WELDING. 130 pages, 8 by 10 1/2 inches. Published by the Lincoln Electric Co., Cleveland, Ohio. Price, 50 cents; foreign countries, 75 cents.

This manual of lessons in arc welding contains forty-four lessons designed to provide arc-welding operators and others interested in the process with a thorough knowledge of the practical application and use of arc welding. This is a new and enlarged edition of a previous publication which contained only twenty-eight lessons. The lessons are based on the course in arc welding which has been conducted by the company in its plant welding school for nearly twenty years. The course begins with general fundamental suggestions and then proceeds to take the student by easy stages through all the important phases of practical arc welding. The book consists of mimeographed sheets and is profusely illustrated with sketches to make the instructions perfectly clear.

DRILLING AND SURFACING PRACTICE. By Fred H. Colvin and Frank A. Stanley. 431 pages, 6 by 9 inches. Published by the McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York City. Price, \$4.

This book deals with the subject of drilling and surfacing, including recent developments in practice. It describes the design, construction, and operation of the machines and tools used, methods of production, speeds and feeds, care of machines and tools, etc. The material is divided into six sections dealing with drilling; reaming and tapping; planers, shapers, and slotters; milling; milling cutters; and broaching.

MECHANICAL WORLD YEAR BOOK (1937). 360 pages, 4 by 6 inches. Published by Emmott & Co., Ltd., 30 King St., West, Manchester 3, England. Price, 1/6.

This is the fiftieth year of publication of this well-known little handbook for mechanical engineers. The material has been revised and brought up to date, and some new information has been added, as, for example, a section on the design and manufacture of toothed gearing. The arrangement and classified buyers' directory feature of the book are the same as in previous editions.

SHARING PROFITS WITH EMPLOYEES. 28 pages, 8 1/2 by 11 inches. Published by the Policyholders Service Bureau of the Metropolitan Life Insurance Co., 1 Madison Ave., New York City.

This pamphlet describes different types of profit-sharing plans and their purposes. It also discusses the details

of organizing and administering a profit-sharing program, covering such subjects as eligibility for participation, amount of profits to be shared, basis of distribution, and form and time of distribution. Case histories of several typical plans in use today are given in detail.

SAFETY. 50 pages, 9 by 12 inches. Published by the National Safety Council, Inc., 20 N. Wacker Drive, Chicago, Ill.

This booklet contains a record of the accident prevention work carried on in twenty-three large industrial organizations, all of which have been active members of the National Safety Council for many years. The facts and figures presented show that the promotion of safety is worth while, not only from the humanitarian side, but also from the economic point of view.

PUNCHES AND DIES. By Frank A. Stanley. 476 pages, 6 by 9 inches. Published by the McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York City. Price, \$4.

This is the second edition of a book dealing with the principles involved in die design and construction. In the revised edition, a large number of illustrations have been added to show certain types of dies. Various sections have been completely rewritten and several entirely new chapters are included.

TENTATIVE CODE OF RECOMMENDED PRACTICES FOR TESTING AND MEASURING AIR FLOW IN EXHAUST SYSTEMS. 13 pages, 8 1/2 by 11 inches. Published by the American Foundrymen's Association, Inc., 222 W. Adams St., Chicago, Ill. Price, \$2.

TENTATIVE CODE OF RECOMMENDED PRACTICES FOR GRINDING, POLISHING AND BUFFING EQUIPMENT SANITATION. 24 pages, 8 1/2 by 11 inches. Published by the American Foundrymen's Association, Inc., 222 W. Adams St., Chicago, Ill. Price, \$2.

CORRELATION BETWEEN METALLOGRAPHY AND MECHANICAL TESTING. By Herbert F. Moore. 35 pages, 6 by 9 inches. Published by the University of Illinois, Urbana, Ill., as Reprint No. 9 of the Engineering Experiment Station. Price, 20 cents.

BASIC STANDARDS OF APPRAISAL PRACTICE AND PROCEDURE. 53 pages, 6 by 9 inches. Published by the Association of Appraisal Executives, 1366 National Press Bldg., Washington, D. C.

GRINDING WHEELS (Safe Practices Pamphlet No. 13). 15 pages, 8 1/2 by

11 inches. Published by the National Safety Council, Inc., 20 N. Wacker Drive, Chicago, Ill.

MACHINE SHOPS (Safe Practices Pamphlet No. 39). 20 pages, 8 1/2 by 11 inches. Published by the National Safety Council, Inc., 20 N. Wacker Drive, Chicago, Ill.

OBITUARIES

Henry Vogt

Henry Vogt, president of the Henry Vogt Machine Co., Louisville, Ky., died at his home in Louisville on Sunday, December 27, at the age of eighty years. He had been ill for a week with a heart ailment.

Mr. Vogt was born in Louisville, where he attended the public schools and later served a machinist's apprenticeship. In 1880, he opened a small shop of his own for general machine repair work and for the manufacture of elevators. Five years later, he added a foundry and a boiler shop. In the same year, the Vogt refrigerating machine was developed. With the introduction of ice machinery in oil refinery work, his firm began to manufacture a general line of refinery equipment. In 1911, the elevator business was sold to the Otis Elevator Co., and the firm added to its output drop-forged valves and fittings for use with high pressures and high temperatures.

Mr. Vogt was a well-known industrial leader and for twenty-five years was also a director of the National Bank of Kentucky. In 1879, he married Miss Matilda Daeuble, who survives him. He is also survived by his daughter, Mrs. Anna Vogt Heuser, two grandchildren, and one great-grandchild.

J. F. MAX PATITZ, chief consulting engineer of the Allis-Chalmers Mfg. Co., Milwaukee, Wis., died suddenly of a heart attack on January 3. He had been associated with the company for more than fifty-one years, nearly twenty-six of which he served as consulting engineer.

Mr. Patitz was born at Mugeln, Saxony, Germany, in 1866. He came to this country with his parents, after having completed a course at the Royal Gymnasium of Dresden. His first employment was obtained in Pittsburgh, where he spent four years working in various factories and machine shops. He then went to Milwaukee, where he entered the employ of the E. P. Allis Co. in June, 1885. As chief consulting engineer of the company, he was in touch with practically all of the major developments of that company during his



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Unique in giving the Flexibility of Control heretofore
provided in the "Column and Knee" Design
(Quick set-ups — Reduction in non-productive time)

Combined with the production advantages of the
"Bed Type" milling machine.
(Unusual rigidity—High production with accuracy)

. an *Economical Investment* for both
Short and Long run jobs.



—Ask for specifications of this cost-saving No. 22 Plain Milling
Machine. Brown & Sharpe Mfg. Co., Providence, R.I., U.S.A.

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SHARPE

lifetime. He had been a member of the American Society of Mechanical Engineers since 1891, and was also a member of the Society of Automotive Engineers.

Pittsburgh Forms Chapter of Tool Engineers

A chapter of the American Society of Tool Engineers was formed January 8 in Pittsburgh, Pa., at a meeting of mechanical executives, engineers, and designers in the Pittsburgh district. Forty-

chapter; D. L. Shelly, of the Westinghouse Air Brake Co., secretary; and Malcolm F. Judkins, of the Firth-Sterling Steel Co., treasurer. Frank Curtis, of the Firth-Sterling Steel Co.,

COMING EVENTS

FEBRUARY 15-26—BRITISH INDUSTRIES FAIR to be held in London and Birmingham, England. Further information may be obtained from the Travel and Industrial Development Association of Great Britain and Ireland, British Empire Bldg., Rockefeller Center, New York.

FEBRUARY 28-MARCH 8—INTERNATIONAL INDUSTRIAL EXHIBITION (LEIPZIG TRADE FAIR) to be held at Leipzig, Germany. Further information may be obtained from the Leipzig Trade Fair, Inc., 10 E. 40th St., New York City.

MARCH 2-3—Regional meeting of the AMERICAN SOCIETY FOR TESTING MATERIALS at the Palmer House, Chicago, Ill. For further information, address the Society, 260 S. Broad St., Philadelphia.

APRIL 19-24—Second International Congress of the INTERNATIONAL ASSOCIATION FOR TESTING MATERIALS to be held in London, England. K. Headlam-Morley, honorary secretary, 28 Victoria St., London, S.W. 1, England.

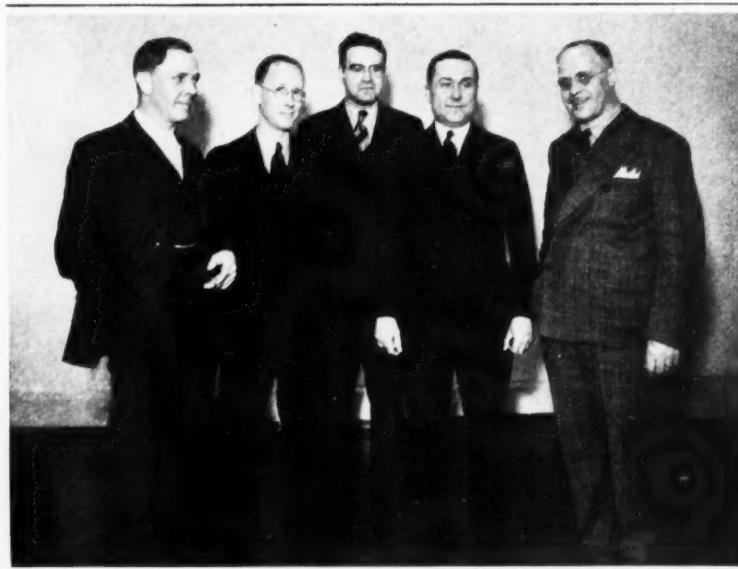
MAY 2—Forty-first annual convention and exposition of the AMERICAN FOUNDRYMEN'S ASSOCIATION in Milwaukee, Wis. C. E. Hoyt, executive secretary-treasurer, 222 W. Adams St., Chicago.

MAY 17-21—Spring meeting of the AMERICAN SOCIETY OF MECHANICAL ENGINEERS at Detroit, Mich., with headquarters at the Hotel Statler. C. E. Davies, secretary, 29 W. 39th St., New York City.

JUNE 28-JULY 3—Fortieth Annual Meeting of the AMERICAN SOCIETY FOR TESTING MATERIALS AND FOURTH EXHIBIT OF TESTING APPARATUS AND RELATED EQUIPMENT at Waldorf-Astoria Hotel, New York City. Headquarters of Society, 260 S. Broad St., Philadelphia, Pa.

OCTOBER 18-22—NATIONAL METAL CONGRESS AND EXPOSITION to be held in the Atlantic City Auditorium, Atlantic City, N. J., under the auspices of the American Society for Metals, 7016 Euclid Ave., Cleveland, Ohio.

OCTOBER 27-NOVEMBER 3—NATIONAL AUTOMOBILE SHOW, at Grand Central Palace, New York City, under the auspices of the Automobile Manufacturers Association, 366 Madison Ave., New York City.



From Left to Right: F. R. Lamb, President, American Society of Tool Engineers, and the Officers of the Pittsburgh Chapter, D. L. Shelly, Secretary; M. F. Judkins, Treasurer; J. R. Weaver, Chairman; and Frank Curtis, Chairman of Program Committee

five members were enrolled, making this the largest chapter of the Society. Ford R. Lamb, president, addressed the meeting and outlined the functions and purposes of the organization. James R. Weaver, of the Westinghouse Electric & Mfg. Co., was elected chairman of the

was appointed chairman of the program committee. The American Society of Tool Engineers, which was organized in Detroit in 1932, now has over 4000 members, with chapters at Racine and Milwaukee; Cleveland; Chicago; Bridgeport and Hartford; and Pittsburgh.

Industrial Machinery Exports Increase

Figures covering the exports of industrial machinery from the United States during November, 1936, have been made available by the Machinery Division of the Department of Commerce. The exports during November were valued at \$12,725,000, as compared with \$12,619,000 during the corresponding month of 1935. The exports of power-driven metal-working machinery reached a value of \$3,785,000 in November, 1936, as compared with \$3,923,000 in November, 1935. In the November, 1936, exports, lathes accounted for \$443,000 and forging machinery for \$174,000. The eleven months' total value of machinery exports from the United States in 1936 was \$143,697,000, as compared with \$110,298,000 during the corresponding period of 1935.

Symposiums on Lubricants and on Corrosion

Two symposiums, one on lubricants and the other on corrosion testing, will be features of the regional meeting of the American Society for Testing Materials, to be held at the Palmer House, Chicago, Ill., Tuesday and Wednesday, March 2 and 3. A number of papers will be presented covering such subjects as "Engine Deposits—Causes and Effects"; "Automotive Bearings—Effect of Design and Composition on Lubrication"; "Addition Agents for Lubricating Oils"; and "How to Select a Motor Oil from the Standpoint of the Consumer." The corrosion testing symposium will cover all important phases of corrosion testing, including tests both in the laboratory and in service, with reports by authorities on the subject.

NEWS OF THE INDUSTRY

California

W. R. SMITH has joined the sales staff of the Los Angeles office, 812 Mateo St., of the Lincoln Electric Co., Cleveland, Ohio. Mr. Smith has been employed in the welding field for ten years. B. J. BRUGGE, who has been engaged in superintending welding operations for the last two years in the Near East, has also joined the sales staff of the Los Angeles office.

District of Columbia

WALTER H. RASTALL, formerly chief of the Machinery Division of the Department of Commerce, has established himself as a manufacturer's agent in Washington, D. C., and is introducing special machinery of various types into Government operations. His address is 5357 Reno Road, N. W. Mr. Rastall is available for representing additional lines of equipment, general as well as special.

Georgia

FOOTE BROS. GEAR & MACHINE CORPORATION, 5319 S. Western Blvd., Chicago, Ill., has appointed H. F. EDGE & Co., 987 Cox Ave., Atlanta, Ga., direct representative in the southeastern territory.

BUNTING BRASS & BRONZE CO., Toledo, Ohio, has opened new branch sales offices and warehouse facilities at 296 Ivy St. N. E., Atlanta, Ga., to take care of the fast growing business in that section.

Illinois

IDEAL COMMUTATOR DRESSER CO., 1011 Park Ave., Sycamore, Ill., manufacturer of electrical products, has acquired the MARSHALL ELECTRIC CO., Elkhart, Ind., manufacturer of automatic regulators for voltage, current and speed control of electrical equipment. The operations of the acquired company will be transferred as rapidly as possible to Sycamore.

L. A. SHEA, formerly Chicago district manager for the Hevi Duty Electric Co., Milwaukee, Wis., has joined the Lindberg Engineering Co., 221 Union Park Court, Chicago, Ill., in the capacity of assistant sales manager. Mr. Shea had been associated with the Hevi Duty Electric Co. for eleven years.



John H. Rodger, New President of the Oxweld Railroad Service Co.

JOHN H. RODGER has been elected president of the Oxweld Railroad Service Co., 230 N. Michigan Ave., Chicago, Ill., a unit of the Union Carbide & Carbon Corporation. Mr. Rodger has been an officer of the company since 1928, having previously been executive vice-president.

ROBERT A. WILSON, GEORGE MANDULA and A. T. COX, JR., have joined the sales staff of the Chicago office, 1455 W. 37th St., of the Lincoln Electric Co., Cleveland, Ohio.

Indiana

JOHN LEES CO., Indianapolis, Ind., manufacturer of rolled metal moldings and stampings, has been purchased by the SERRICK CORPORATION of Defiance, Ohio, and moved to Muncie, Ind., where it has been combined with the ACME MACHINE PRODUCTS CO., which is operated by the Serrick Corporation; the two companies together comprise the MUNCIE DIVISION OF THE SERRICK CORPORATION. C. R. POOLE has been appointed general manager of the new division. Approximately 650 persons will be given employment.

AMERICAN FOUNDRY EQUIPMENT CO., Mishawaka, Ind., is building two additions to its plant. This expansion, upon completion, will double the space available for the engineering and erection departments. Both buildings are of modern fabricated steel construction, completely fireproof.

LESLIE L. ANDRUS, assistant sales manager of the American Foundry Equipment Co., Mishawaka, Ind., for the last two years, has been appointed general sales manager.

Michigan

RALPH S. JENKINS has been appointed vice-president in charge of manufacturing of all divisions of Gar Wood Industries, Inc., Detroit, Mich. Mr. Jenkins was previously general manager of the St. Paul Hydraulic Hoist Co., Minneapolis, Minn.

GODDARD & GODDARD CO., INC., Detroit, Mich., manufacturer of milling cutters, has been awarded the trophy for the plant's safety record during 1936 by the Detroit Industrial Safety Council. In winning this trophy, the Goddard & Goddard plant competed with seventy-nine plants in the Detroit area, representing approximately 240,000 employees. During the year there were no losses of time due to accidents.

CLAYTON R. BURT, president, and TELL BERNA, manager, of the National Machine Tool Builders' Association, and GEORGE A. FERNLEY, advisory secretary of the Associated Machine Tool Dealers, were the guests of the Detroit Area Associated Machine Tool Distributors at a luncheon and conference at the Recess Club, Detroit, Mich., February 9.

Missouri and Kentucky

LINK-BELT CO., 307 N. Michigan Ave., Chicago, Ill., has appointed ERWIN A. WENDELL district sales manager, with headquarters at 317 North 11th St., St. Louis, Mo. Mr. Wendell succeeds HOWARD L. PURDON, who has been transferred to the company's Chicago plant.

MEDART CO., Potomac and DeKalb Sts., St. Louis, Mo., manufacturer of power transmission machinery, announces the opening of a district sales office in the Dierks Bldg., Room 1559, Kansas City, Mo. W. A. CROOKS is in charge.

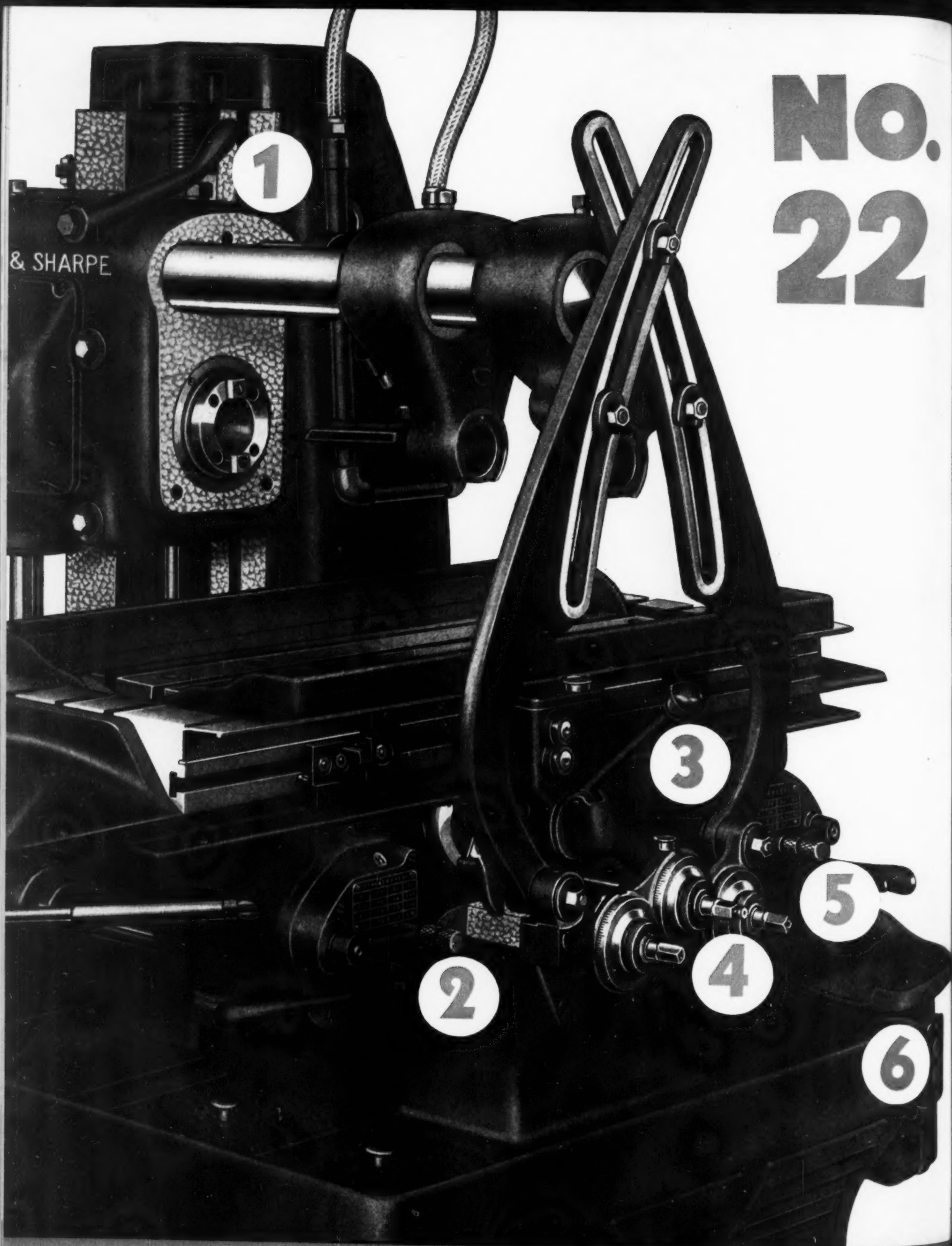
EMERSON ELECTRIC MFG. CO., St. Louis, Mo., recently moved into new offices at 1824 Washington Ave. The space formerly devoted to office use at 2018 Washington Ave. has been absorbed by the manufacturing department.

AJAX FLEXIBLE COUPLING CO., 12 English St., Westfield, N. Y., has opened a new sales office in Louisville, Ky., with ALFRED HALLIDAY in charge.

New York

GEORGE A. SMITH, assistant manager of mechanical goods, Hudson St. Branch, United States Rubber Products, Inc.,

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BROWN &

HANDINESS

— unique in a **BED-TYPE** Milling Machine

. giving the **Flexibility of Control** heretofore provided in the “Column and Knee” Design
(Quick set-ups—Reduction in non-productive time)

All Controls at Front

- 1**— Head clamped by single lever. Elevated by hand crank at front.
- 2**— Feed changes by rotating lever, with direct-reading dial.
- 3**— Directional hand control of power table movements. (Automatic cycles governed by table dogs.)
- 4**— Accurate dialing for vertical adjustment of spindle—transverse adjustment of saddle—longitudinal adjustment of table. Note large dials.
- 5**— Spindle speed changes by rotating lever, with direct-reading dial. (Automatic spindle stop provided.)
- 6**— Motor push-button convenient—with starting lever just above.



Ask for details of this high production, bed-type, No. 22 Plain Milling Machine for Long and Short run jobs—Brown & Sharpe Mfg. Co., Providence, R.I., U.S.A.

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SHARPE

1790 Broadway, New York City, was tendered a dinner on January 29 in honor of the fifty years of service with the company which he has just completed. The dinner was given at the Hotel Lafayette in New York. Mr. Smith entered the service of the company in January, 1887, as assistant manager of city sales. He held this position until 1907, when he became city sales manager. In 1931, he was appointed assistant manager of the New York branch of the Mechanical Goods Division, which position he still holds.

JOHN W. SANDS, of the Development and Research Division of the International Nickel Co., Inc., 67 Wall St., New York City, spoke on February 15 before the Machine Design Section of the Cleveland Engineering Society, Cleveland, Ohio, on "The Role of Nickel in Modern Machine Tool Construction." His discussion centered around the properties of nickel-alloy steels and nickel cast irons as at present applied in machine tool manufacture.

BAUSCH & LOMB OPTICAL Co., Rochester, N. Y., has opened a new laboratory for applied research at a cost of approximately \$40,000, and has made a 50 per cent increase in its staff of chemical engineers and metallurgists. Nearly 9000 square feet of space has been converted into a series of laboratories which are engaged in research in the fields of metallurgy, experimental electroplating, spectroscopy, photomicrography, and physical testing.

H. J. FRENCH, in charge of alloy steel and iron development for the International Nickel Co., Inc., 67 Wall St., New York City, addressed the Worcester Chapter of the American Society for Metals on February 4. Mr. French

reviewed the more important phases of the past year's progress in the manufacture, selection, and utilization of alloy steels.

R. B. RENNER, who has been associated with the Jeffrey Mfg. Co., Columbus, Ohio, for thirty years as mechanical engineer (for the last twenty years at 30 Church St., New York City), was recently made chairman of the executive committee of the Materials Handling Division of the American Society of Mechanical Engineers.

FRED J. WALLS, a member of the development and research division of the International Nickel Co., Inc., 67 Wall St., New York City, addressed the New England section of the Society of Automotive Engineers at its February 9 meeting on the subject "Cast-Iron Crankshafts and Camshafts."

SWAN-FINCH OIL CORPORATION has removed its executive offices and New York sales offices from 205 E. 42nd St. to larger and more centrally located offices at 30 Rockefeller Plaza, New York City.

MODERN MACHINE CORPORATION, manufacturer of ball-bearing centers, announces its removal from 285 N. Sixth St., Brooklyn, N. Y., to larger quarters at 323 Berry St., Brooklyn.

Pennsylvania and Ohio

HENRY DISSTON & SONS, Inc., Philadelphia, Pa., on February 3, awarded gold pins to seventy-nine employees who had been in the company's service for fifty years or more. Five men, four active and one pensioned, received sixty-

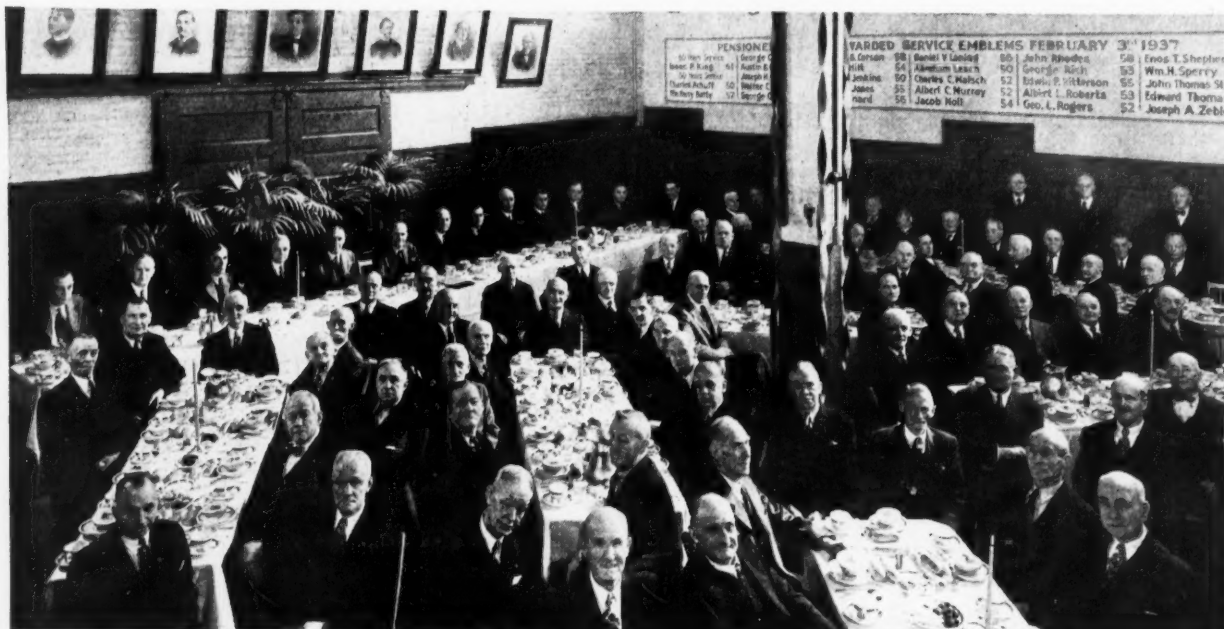
year pins; forty-seven active and twenty-seven pensioned men were given fifty-year pins. The pins were distributed at a luncheon given at the company's plant. From the foregoing, it will be noted that there are, at the present time, fifty-one men actively employed by the company who have to their credit fifty or more years of service.

WELLES G. CATLIN, formerly with the Shepard-Niles Crane & Hoist Co., has joined the staff of the personnel training division of the International Correspondence Schools, Scranton, Pa. Mr. Catlin is a graduate of Cornell, with the degree of electrical engineer. He has specialized in industrial production planning, and in his new position will coordinate trade practice and technical instruction of the International Correspondence Schools.

CHARLES B. VEIT has been appointed sales manager of the Wright Manufacturing Division of the American Chain & Cable Co., Inc., with headquarters at York, Pa., and S. J. WOODWORTH has been appointed district manager for the New York territory, with headquarters at the New York Central Building, 230 Park Ave., New York City.

ROGER E. RISLEY, who has been associated with the Cincinnati Milling Machine and Cincinnati Grinders Incorporated since 1929, first in the Chicago sales office, and since 1933 as district sales manager in the Pittsburgh district, is now connected with the S. R. Dresser Mfg. Co., of Bradford, Pa. (effective March 1).

C. M. HOUCK, formerly manager of the inspection division of the Pittsburgh Testing Laboratory, Stevenson and Locust Sts., Pittsburgh, Pa., was elected vice-president at the last meeting of



A Luncheon Given at the Plant of Henry Disston & Sons at which Gold Pins were Awarded to Seventy-nine Employees who have been in the Company's Service Fifty Years or More

The Aristocrat of Bearings



Built to
S. A. E. and U. S. NAVY
specifications
HOOVER
BALL AND TAPERED ROLLER
BEARINGS

HOOVER
BALL AND
BEARING
COMPANY

ANN ARBOR

MICHIGAN

the board of directors to succeed A. R. ELLIS, who was recently elected president.

MONARCH MACHINE TOOL Co., Sidney, Ohio, manufacturer of lathes, has opened an office in Pittsburgh in the Chamber of Commerce Bldg., and will sell direct in the Pittsburgh territory. ELMORE L. ROSS is in charge of the new office.

FRED SCHONBERGER has been appointed a representative in the Philadelphia territory of the Carboloy Company, Inc., 29 E. Jefferson Ave., Detroit, Mich.

DEFIANCE PRESSED STEEL Co., Marion, Ohio, presented an opportunity to its customers, suppliers, civic groups, and residents of Marion to inspect the company's new plant and facilities for producing metal stampings during the open-house days held February 11, 12 and 13. Every department of the new plant is now in production.

Rhode Island

G. A. RUEHMLING has become general manager of the Schrumm Process Co.,

Providence, R. I., builder of controlled-atmosphere furnaces for bright annealing, brazing, and special metal-treating processes. Mr. Ruehmling was formerly connected with the General Plate Co., Attleboro, Mass., in the capacity of manager of sales and engineering.

TAFT-PEIRCE MFG. Co., Woonsocket, R. I., has been appointed exclusive distributor of the Webber precision gage-blocks. These gage-blocks were developed by George Webber of Cleveland, Ohio.

Wisconsin and Minnesota

T. D. MONTGOMERY has been appointed manager of the foreign sales division of Cutler-Hammer, Inc., 12th and St. Paul Ave., Milwaukee, Wis., manufacturer of electric control apparatus.

LOYD B. EDWARDS Co., 840 Lumber Exchange Bldg., Minneapolis, Minn., has recently been appointed agent in Minnesota and North and South Dakota for the overhead cranes, hoists, and motors made by the Harnischfeger Corporation, Milwaukee, Wis.

COMING EVENTS

MARCH 3-5—Sixth annual WELDING CONFERENCE AND EXPOSITION at the Department of Industrial Engineering, Ohio State University, Columbus, Ohio. Professor O. D. Rickly, Department of Industrial Engineering, Ohio State University, general chairman.

APRIL 13-15—Eighth Annual Convention of the GREATER NEW YORK SAFETY COUNCIL at the Hotel Astor, New York City. Julien H. Harvey, executive vice-president, 60 E. 42nd St., New York City.

APRIL 19-22—SECOND MACHINE TOOL ELECTRIFICATION FORUM at the Works of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

APRIL 19-24—Second International Congress of the INTERNATIONAL ASSOCIATION FOR TESTING MATERIALS to be held in London, England. K. Headlam-Morley, honorary secretary, 28 Victoria St., London, S.W. 1, England.

MAY 2—Forty-first annual convention and exposition of the AMERICAN FOUNDRYMEN'S ASSOCIATION in Milwaukee, Wis. C. E. Hoyt, executive secretary-treasurer, 222 W. Adams St., Chicago, Ill.

MAY 17-21—Spring meeting of the AMERICAN SOCIETY OF MECHANICAL ENGINEERS at Detroit, Mich., with headquarters at the Hotel Statler. C. E. Davies, secretary, 29 W. 39th St., New York City.

JUNE 28-JULY 3—Fortieth Annual Meeting of the AMERICAN SOCIETY FOR TESTING MATERIALS AND FOURTH EXHIBIT OF TESTING APPARATUS AND RELATED EQUIPMENT at Waldorf-Astoria Hotel, New York City. Headquarters of Society, 260 S. Broad St., Philadelphia, Pa.

SEPTEMBER 23-25—Conference of the NATIONAL INDUSTRIAL ADVERTISERS ASSOCIATION at Edgewater Beach Hotel, Chicago, Ill. For further information address National Industrial Advertisers Association, Inc., 100 E. Ohio St., Chicago, Ill.

OCTOBER 18-22—NATIONAL METAL CONGRESS AND EXPOSITION to be held in the Atlantic City Auditorium, Atlantic City, N. J., under the auspices of the American Society for Metals, 7016 Euclid Ave., Cleveland, Ohio.

OCTOBER 27-NOVEMBER 3—NATIONAL AUTOMOBILE SHOW, at Grand Central Palace, New York City, under the auspices of the Automobile Manufacturers Association, 366 Madison Ave., New York City.

NEW BOOKS AND PUBLICATIONS

BIG BUSINESS—ITS GROWTH AND ITS PLACE. Edited by Alfred L. Bernheim. 102 pages, 5 1/2 by 8 inches. Published by the Twentieth Century Fund, Inc., 330 W. 42nd St., New York City. Price, \$1.35.

This volume is the first of a series summarizing the results of a study of "big business" which has been undertaken by a special research staff of the Twentieth Century Fund under the direction of Rufus S. Tucker. The object has been to find out as far as the known facts can reveal, the role of the giant corporation in American life. A special committee, under the chairmanship of Ralph E. Flanders, president of the Jones & Lamson Machine Co., has had general charge of the undertaking.

The material presented in this volume is purely factual. While certain conclusions are drawn from the facts, they also are factual. Economic judgments and suggestions for action have been rigidly excluded. They will be formulated by the committee at a later date.

The book is divided into eight chapters dealing with: The Growth and Extent of Incorporation; The Rise of Large Corporations; Concentration of Operating Units; Concentration of Cor-

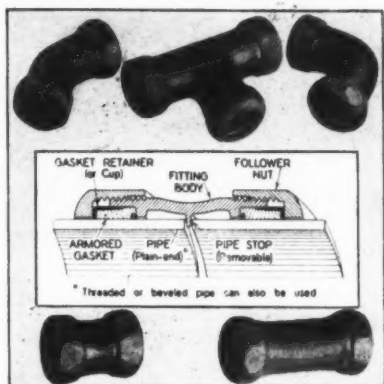
porate Wealth; Concentration of Corporate Income; Concentration in Banking; Concentration of the Total National Income Produced; and Conclusions.

HENLEY'S TWENTIETH CENTURY BOOK OF FORMULAS, PROCESSES, AND TRADE SECRETS. 883 pages, 5 1/2 by 8 1/2 inches. Published by the Norman W. Henley Publishing Co., 2 W. 45th St., New York City. Price, \$4.

This is the 1937 edition of a well-known book containing over ten thousand formulas for the laboratory, work shop, factory, home, and office. In the new edition, the text has been revised and hundreds of new formulas have been added, as well as a hundred new pages. The formulas cover almost everything imaginable from simple home recipes to technical processes. The scope of the book is so great that it would be impossible to give a list of the contents, but a few of the subjects of interest in the mechanical field include alloys, annealing, babbitt metals, preservation and cleaning of drawings, etching and enameling, soldering, cements, plating, lubricants, metals, rust preventives. There is a special illustrated chapter on work-shop and laboratory methods, and a dictionary of the materials referred to throughout the book is included.

SHOP EQUIPMENT SECTION

90-degree ells, and tees. They are all supplied in standard steel pipe sizes from 1/2 to 2 inches inside diameter, and black or galvanized. The fittings are recommended by the manufacturer for use on machine tools to carry



Dresser Fittings which can be Used on Plain Unthreaded Pipe

cutting coolant or oil and also for other lines conveying oil, gas, water, air, etc.

Davey Improved Portable Balancing Equipment

Improvements in the Davey portable balancing equipment previously described in **MACHINERY** have recently been announced by the Electrocon Corporation, 6 Varick St., New York City. The illustration shows complete equipment suitable for use in balancing large turbines, fans, pumps, motors, and similar apparatus.

The photographic feature of the "two-direction" Vibrometer enables records of turbine vibration to be made periodically, which is often the means of discovering troubles before they become serious. A Model S2, Vibrometer, which measures in two directions simultane-

ously and also indicates wave form, is shown at the right of the illustration, and a single-direction Model 1 Vibrometer in the center. These two models can be used interchangeably. The Model 3 Stroboscopic lamp with three neon tubes is shown at the left.

In the left foreground are a breaker head and phase adjuster, coupled to a synchronous motor unit. This unit is a new feature used in balancing 60-cycle machines running at speeds of 1200, 1800, or 3600 revolutions per minute. By its use it is unnecessary to couple the breaker head to the shaft of the machine, and so the motor and breaker head can be used at the point most convenient to the operator. For machines running at other speeds, however, the breaker head is driven from the end of the shaft by means of a tachometer point.

* * *

California has the largest number of automobiles in proportion to population, of any state in the Union, having one car to every 2.62 inhabitants. New York state leads all the other states in the total number of motor vehicle registrations, but the proportion to population is less than one to five.



Davey Equipment for Use in Balancing Large Turbines and Similar Machinery

Foundry Equipment Exhibition in Milwaukee

In connection with the convention of the American Foundrymen's Association in Milwaukee, May 3 to 7, an extensive exhibition of foundry equipment and supplies will be held. More than seventy-five classifications of machines, supplies, and materials will be exhibited by nearly two hundred firms. In number of exhibits, the show will exceed that held in Detroit last year. The complete facilities of the Milwaukee Municipal Auditorium will be utilized. The opening hour of the exhibition is set at 1 P.M., May 3, and the exhibition will remain open until 10 P.M. that night. On other days, the hours will be from 8:30 A.M. to 5 P.M.

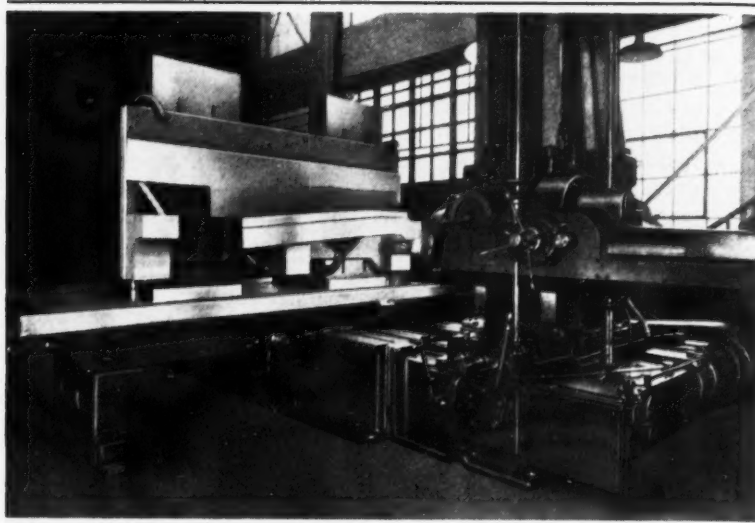
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Taxation Running Rampant

On many occasions in the past, we have called attention to our present methods of taxation and pointed out that the excessive amount of taxes being collected by our federal, state and municipal governments is one of the most serious handicaps to industrial revival and to the continuous prosperity of our industries,

which means the prosperity of the entire population. Alfred Reeves, vice-president of the Automobile Manufacturers Association, recently pointed out that in 1935, the motor car owners in the United States paid a total of \$1,286,000,000 in taxes, an average of close to \$50 per vehicle. This included taxes on gasoline, horsepower, weight, value, and seating capacity. Some states have as many as twenty different kinds of taxes applying to automobilists.

Machining a Large Saddle for an Automobile Fender Die on a Giddings & Lewis Boring, Drilling, and Milling Machine Equipped with a Saddle Support of Recent Design



Machine Tool Exhibition on the Pacific Coast

The largest machine tool exhibition ever held on the Pacific Coast was recently conducted by the Herberts Machinery Co., Ltd., Los Angeles, Calif. Twenty-one machine tool and shop equipment manufacturers cooperated in making this an outstanding event. Approximately twenty carloads of machinery were on exhibition, practically all in operation. The show was attended by more than 14,500 people. Demonstrators connected with the Herberts company, as well as factory representatives and demonstrators from the plants of the machine manufacturers, were on hand to point out the features of the machines exhibited. The interest in the exhibition manifested itself in many orders for new equipment.

Bars Rolled to Required Cross-Section

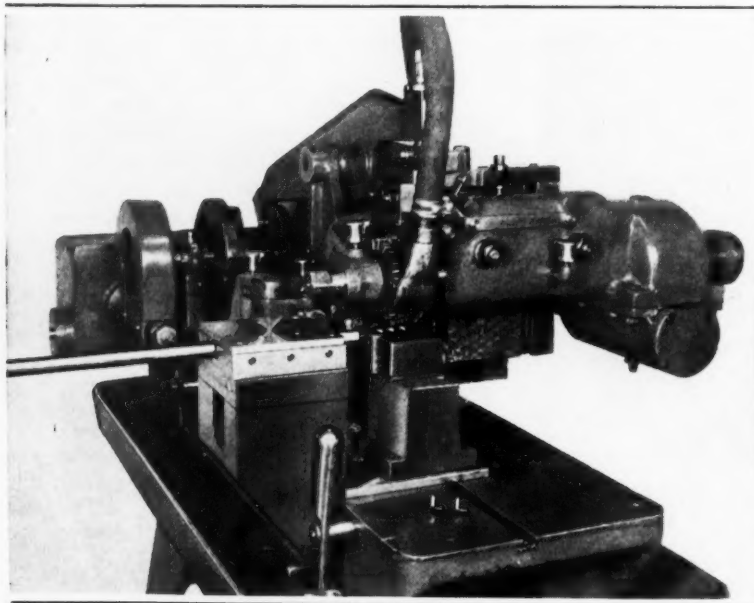
By JOHN THIER, Jr.

Referring to the article on page 376 of February MACHINERY, the writer would suggest that, since, judging by the character of the tools used, the hubs are required in large quantities, it would be more economical to make them from formed bars rolled at the steel mill in any desired length. Slight modifications might be required, but these would probably present no practical difficulties. By using such rolled cross-sections, the first five operations would be entirely eliminated.

Rolled sections are now frequently used in machine construction to save machining operations. Examples of their applications have been shown in past numbers of MACHINERY.

Saving a New Casting by Bronze-Welding

A new 10-ton pump casting was almost ready for assembly, an investment in casting and machining of \$2000 having already been made in it. It was then discovered that there was a fracture in the casting at a section containing a bearing. The fracture was repaired by bronze-welding with the approval of the customer. This incident took place in May, 1932. Four years later the customer reported that the pump was entirely satisfactory, that the welded casting gave every evidence of being just as good as one that had been perfect from the beginning, and that the rejection of the casting because of a fracture that could be so perfectly repaired would have been an unnecessary and wholly unjustifiable waste.



Milling and Cutting off Pieces of 13/16-inch Bar Stock to a Length of 3/8 Inch at the Rate of 200 Pieces an Hour in a Prodo-Matic Milling Machine. The Stock is Fed Automatically to the Work-holding Jaws. Bars of Round, Square, Hexagonal, or Other Shape up to 4 Inches in Maximum Cross-sectional Dimension can be Handled

NEWS OF THE INDUSTRY

Illinois, Indiana and Missouri

FOOTE BROS. GEAR & MACHINE CORPORATION, 5319 S. Western Blvd., Chicago, Ill., announces that E. G. AKRIDGE has been appointed direct factory representative in the Detroit territory, succeeding THOMAS LORD, who has resigned. F. A. EMMONS, JR., will handle the North Side of the Chicago territory, and HARRY HARRISON will be sales engineer in the central Chicago territory.

CARBOLOY COMPANY, INC., 2987 E. Jefferson Ave., Detroit, Mich., announces that F. J. STAROBA will act as an additional district representative at the company's Chicago office. He will cover southern Illinois, Missouri, and Kansas, replacing Mr. Deeds, who has been assigned to the Indiana and Kentucky territories.

GITS BROS. MFG. CO., Chicago, Ill., manufacturer of oil-cups and lubricating devices, has recently found it necessary to add 6000 square feet of floor space to the company's former capacity of 55,000 square feet. The addition, just completed at 1840 S. Kilbourn Ave., includes new office quarters, drafting-room and executive offices, and an employees' lunch room.

BANTAM BALL BEARING CO., South Bend, Ind., will be known in the future as the BANTAM BEARINGS CORPORATION, which name more clearly describes its present-day production. When the company was organized forty years ago, the entire business was devoted to ball bearings. Since that time, however, the company has entered the roller bearing field as well, and today 90 per cent of the company's business comprises straight and tapered roller bearings.

ALLEN-BRADLEY CO., 1331 S. First St., Milwaukee, Wis., announces that it is now represented in the Kansas City territory by B. L. MCCREARY, with offices in the Mutual Bldg., 405 E. 13th St., Kansas City, Mo.

Maryland

PANGBORN CORPORATION, Hagerstown, Md., manufacturer of blast cleaning and dust-collecting equipment, is making extensive additions to its plant. The company's payroll is the largest in the thirty-three years of its history. The plant is operating in two shifts.

G. H. TRESLAR has been appointed supervisor of the Detroit and Cleveland territories of the Black & Decker Mfg. Co., Towson, Md., and will cooperate with the managers of those branches in the promotion of sales.

Michigan and Wisconsin

RELIANCE ELECTRIC & ENGINEERING CO., Cleveland, Ohio, announces that J. LAWRENCE BUELL, JR., is now in charge of the company's branch office at 3105 E. Grand Blvd., Detroit, Mich., as district manager. Z. A. READER and FRANK J. DENISON are also connected with the Detroit office. ELWOOD H. KOONTZ has been added to the sales staff of the Philadelphia office.

N. B. GILLILAND has joined the sales engineering staff of the Detroit office of the Lincoln Electric Co., and will be located at 2457 Woodward Ave., Detroit, Mich. Mr. Gilliland comes to the Lincoln Electric Co. with valuable experience as assistant instructor of welding at the Ohio State University.

JOHN M. SCHREINER has been appointed manager of the Detroit branch of the Black & Decker Mfg. Co., Towson, Md., to succeed the late George W. Stolber. Mr. Schreiner has been active in the Detroit area for the last twelve years.

GENERAL GEAR CO., Detroit, Mich., specialist in the manufacture of small gears, has moved into new and larger quarters at 6061 Wabash Ave. F. A. BERNSTEIN is general manager.

ROBERT F. VOGT, assistant chief consulting engineer of the Allis-Chalmers Mfg. Co., Milwaukee, Wis., since 1921, has been appointed chief consulting engineer to succeed the late J. F. Max Patitz. Mr. Vogt is a graduate of the Polytechnic Institute at Zurich, Switzerland. He came to the United States in 1903 and has been connected with the Allis-Chalmers Mfg. Co. since 1907.



W. A. Purtell, New President of Billings & Spencer Co.



© Bachrach

James Allison, Recently Appointed Factory Manager of Billings & Spencer Co.

New England

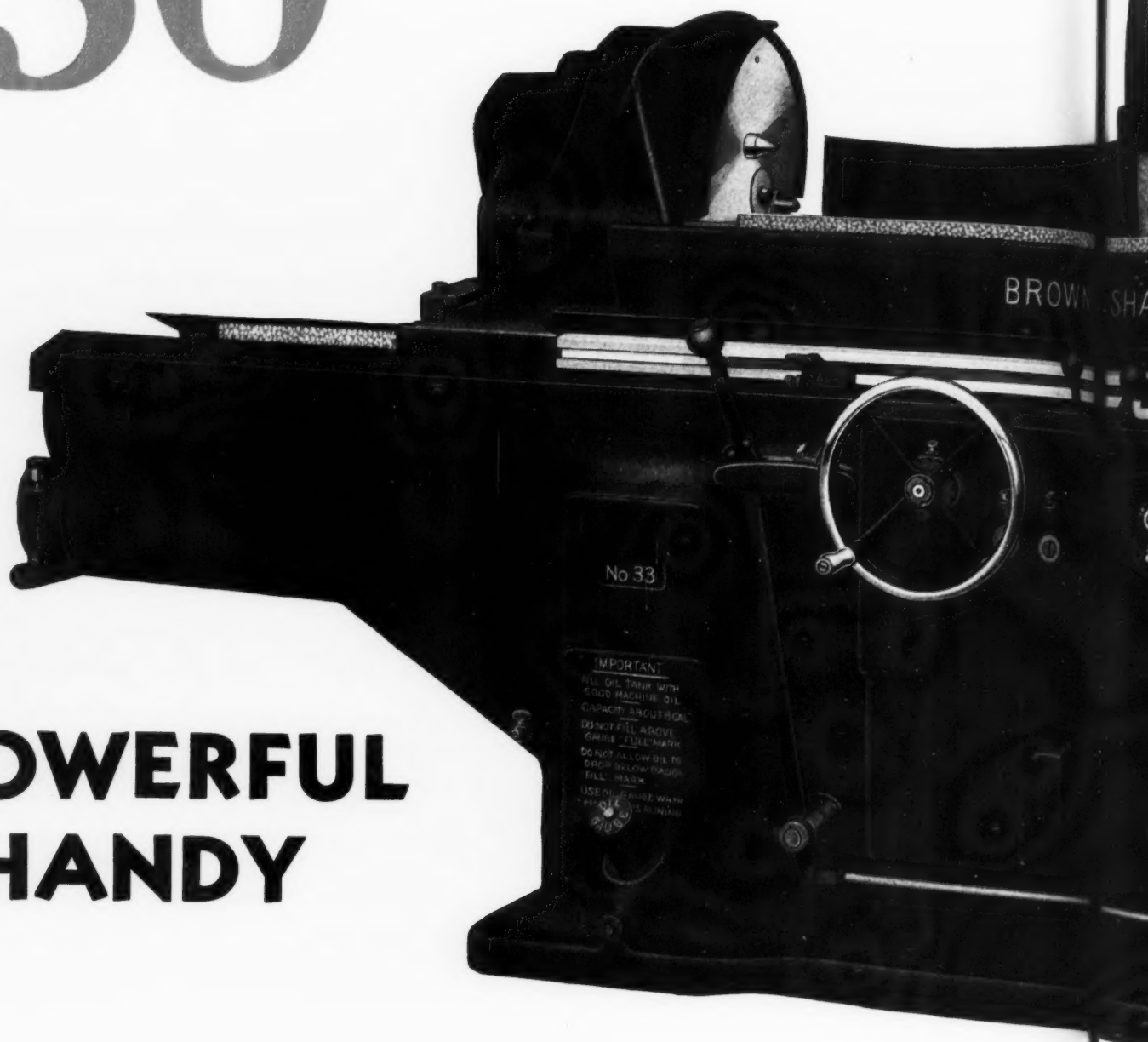
BILLINGS & SPENCER CO., Hartford, Conn., has elected W. A. PURTELL president. FREDERICK C. BILLINGS, who has been president of the company for many years, becomes chairman of the board. W. ROY MOORE was re-elected vice-president and general manager; HOWARD E. OBERG, vice-president; and M. MICHMAN, secretary-treasurer. Mr. Purtell is also president of the Holo-Krome Screw Corporation of Hartford, Conn., and will continue as president and general manager of that company as well. JAMES ALLISON, formerly field service metallurgist for the Union Drawn Steel Co. in the New York and New England areas, becomes factory manager of the Billings & Spencer Co. He has had long experience in the steel field, having been connected with the Crucible Steel Co., the Jones & Laughlin Steel Corporation, the American Bridge Co., and the Mesta Machine Co. He is also a graduate of Princeton University and the Carnegie Institute of Technology.

FARREL-BIRMINGHAM CO., INC., Ansonia, Conn., at its annual stockholders' meeting, re-elected NELSON W. PICKERING president; CARL HITCHCOCK, vice-president; A. G. KESSLER, vice-president; FREDERICK M. DREW, JR., treasurer; and GEORGE C. BRYANT, secretary. FRANKLIN FARREL, JR., was re-elected chairman of the board of directors.

L. HERES DE WYK & SON, Ansonia, Conn., have been appointed sales agents in Connecticut, Massachusetts, and Rhode Island for the industrial hydraulic press division of A. B. FARQUHAR CO., LTD., York, Pa.

FRANK J. ENRIGHT has joined the A. F. Holden Co., New Haven, Conn., manufacturer of heat-treating baths, as director

"30 SERIES"

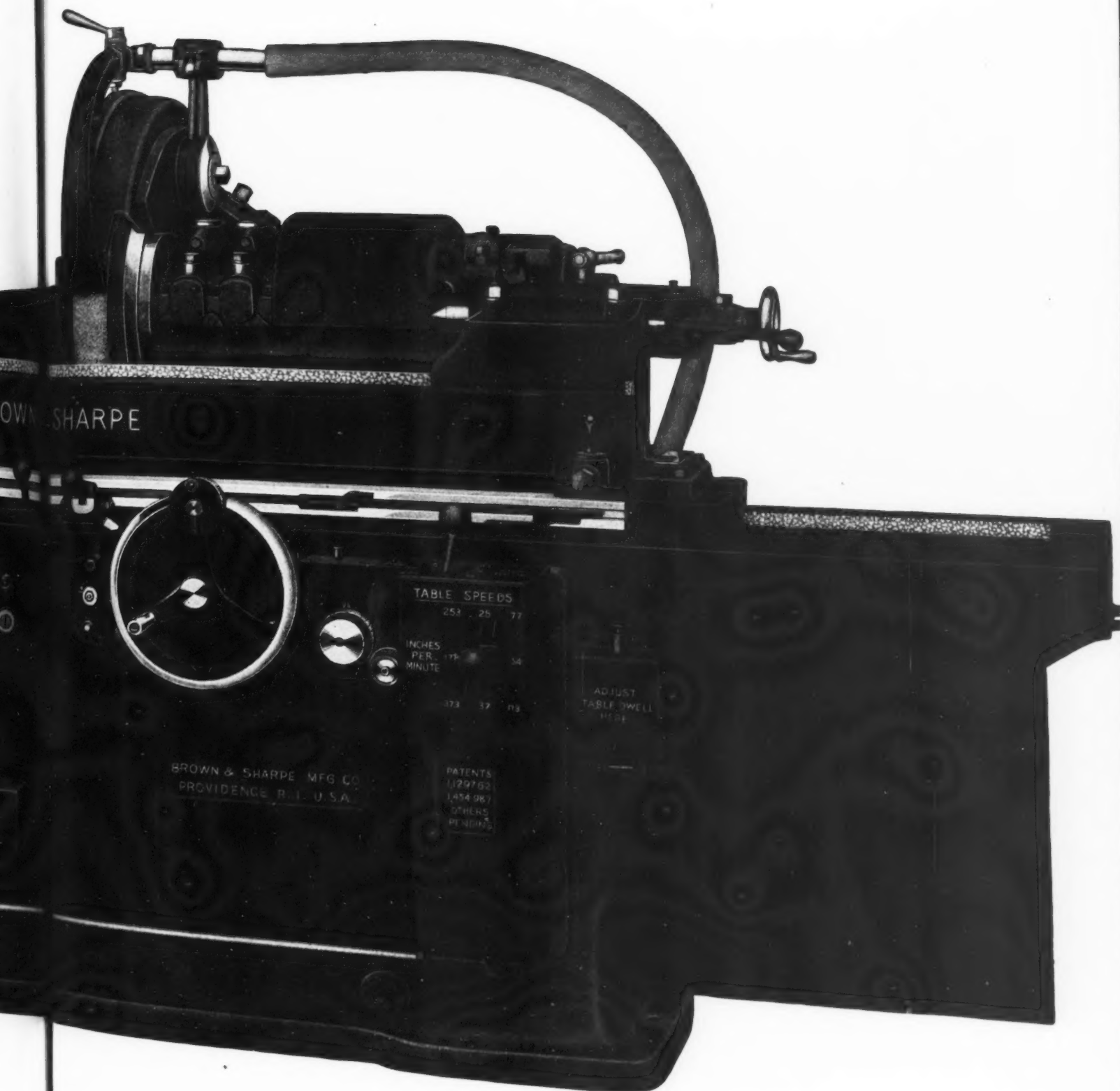


- **POWERFUL**
- • **HANDY**

**HIGH PRODUCTION ---- WITH
DEPENDABLE ACCURACY**

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BROWN &



Specifications of the several sizes and types of these profitable Plain Grinding Machines sent on request. Brown & Sharpe Mfg. Co., Providence, R. I., U. S. A.

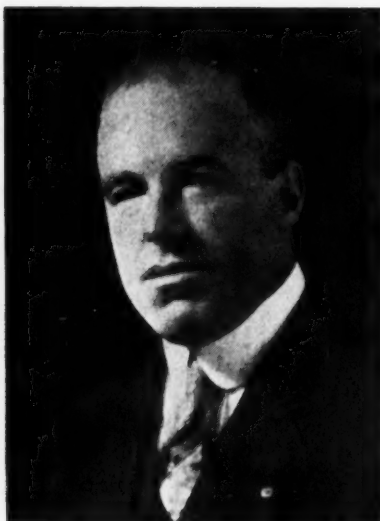


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BROWN & SHARPE



**Frank J. Enright, Director
of Sales and Advertising
of A. F. Holden Co.**



**David Blanchard, Vice-
president in Charge of
Sales, Magnus Chemical Co.**



**Victor Brook, Executive
Vice-president of the High
Speed Hammer Co.**

of sales and advertising. Mr. Enright was formerly advertising manager of *Metal Progress*, published by the American Society for Metals, with which he has been connected for the last six years. He began his advertising career over twenty years ago with the McGraw-Hill Publishing Co.

R. J. SOUTHWELL has been appointed sales manager of Andrew C. Campbell Division of American Chain & Cable Co., Inc., manufacturer of Campbell abrasive cutting machines, Campbell nibbling machines and special machinery, with headquarters at Bridgeport, Conn.

BROWN & SHARPE MFG. CO., Providence, R. I., on March 11, held its first general gathering of graduate apprentices, at a dinner at the Biltmore Hotel in Providence. At this gathering were present about three hundred Brown & Sharpe apprentice graduates, one hundred of whom are today located outside of the Brown & Sharpe plant. Massachusetts, Connecticut, Vermont, New York, New Jersey, and Illinois were represented, in addition to Rhode Island. A great number of these men now hold executive positions with other firms, many being owners or principal partners. The oldest graduate attending was Frank H. Lord, who graduated in 1882; Charles F. Northup, second oldest graduate attending (1884), is now representative of the Brown & Sharpe Mfg. Co. at Syracuse, N. Y.

LINCOLN ELECTRIC CO., Cleveland, Ohio, has appointed JOHN S. HUMBLE arc-welding consultant for its Boston office at 10 High St., of which J. E. Raney is in charge. Mr. Humble has had long experience in the practical application of electric welding.

FOXBORO CO., Foxboro, Mass., announces that the company's Atlanta, Ga., office has been moved to Room 715, 101 Marietta St. Bldg.

New Jersey

DAVID BLANCHARD has been appointed vice-president in charge of sales of the Magnus Chemical Co., Inc., Garwood, N. J., manufacturer of cleaning materials, emulsifying agents, and metal-working lubricants. Mr. Blanchard has been vice-president of the company for the last fourteen years, in charge of the Portland, Me., office. He has been connected with the company since its inception in 1921. He will have supervision of the sales organization and direct the merchandising of new products.

RICHARD W. DINZL has been appointed chief engineer of the Watson-Stillman Co., Roselle, N. J. Mr. Dinzl was formerly with the Baldwin-Southwark Corporation, in charge of engineering for the Southwark Division.

New York

VICTOR BROOK, for over twenty-one years with MACHINERY as associate editor, field service manager, and district advertising manager, has recently resigned to join the High Speed Hammer Co., Inc., Rochester, N. Y., as executive vice-president, with principal duties concerned with product development, sales, and advertising. The very best wishes of his associates on MACHINERY's staff go with Mr. Brook in his new connection. Previous to joining MACHINERY's organization, Mr. Brook was engaged in product and tool design with the Arrow Electric Co., Hartford, Conn., the Noiseless Typewriter Co., Middletown, Conn., and the General Electric Co., Lynn, Mass. He will be succeeded by DWIGHT COOK, who for the last year and a half has been with *Power Plant Engineering* as advertising representative in the Philadelphia territory, and who previously was sales manager with the Toledo

Synthetic Products Co. In addition, Mr. Cook has been for seven years advertising representative of two nationally known mechanical journals.

JAMES G. MARSHALL, general superintendent of the Niagara and Welland plants of the Union Carbide Co. and the Electro Metallurgical Co., has been awarded the Jacob F. Schoellkopf medal for 1937, according to an announcement by the Western New York Section of the American Chemical Society. Presentation of the medal, which is awarded by the Society annually for meritorious chemical achievement, will be made next October. The award to Mr. Marshall is a tribute to his notable technical contributions to the calcium-carbide and ferro-alloy industry.

DR. W. D. COOLIDGE and DR. IRVING LANGMUIR, director and associate director, respectively, of the General Electric Co.'s Research Laboratory, Schenectady, N. Y., were awarded the John Scott medals and awards for 1937, at a dinner of the American Philosophical Society in Philadelphia, Pa., March 5. Each award consists of a certificate, a copper medal, and \$1000. The award to Dr. Coolidge was made because of his application of a new principle in X-ray tubes; the award to Dr. Langmuir was made for his physical and chemical discoveries resulting in improved gas-filled incandescent lamps.

AMTORG TRADING CORPORATION, 261 Fifth Ave., New York City, announces that DAVID A. ROSOFF has been elected chairman of the board of directors and president of the Amtorg corporation, succeeding IVAN V. BOYEFF, who will return shortly to the Soviet Union. For the last year and a half Mr. Rosoff has been first vice-president of Amtorg, and prior to that time has headed various Soviet foreign trade organizations for a number of years.

The Aristocrat of Bearings



*Protecting the reputations
of
America's finest equipment*
**HOOVER
BALL AND TAPERED ROLLER
BEARINGS**

**H O O V E R
B A L L A N D
B E A R I N G
C O M P A N Y**

ANN ARBOR

•

MICHIGAN

MACHINERY, April, 1937—572-G



**W. L. Weaver, Manager of
Stainless Castings Sales,
Ludlum Steel Co.**

W. L. WEAVER has been appointed manager of stainless castings sales of the Ludlum Steel Co., Watervliet, N. Y. Mr. Weaver has been associated with the company for the last twenty years as salesman and district sales manager, and has also been engaged in special sales development work at the home office.

H. F. HENRIQUES and J. J. LINCOLN, Jr., have been appointed assistant general sales managers of the Air Reduction Sales Co., New York City, with headquarters in Cleveland and Pittsburgh, respectively. J. M. DRISCOLL has been appointed acting manager at Cleveland, and S. D. EDSALL, acting district manager at Pittsburgh. A. W. BROWN has been made assistant railroad sales manager with headquarters in New York City.

NIAGARA MACHINE & TOOL WORKS, 637 Northland Ave., Buffalo, N. Y., announces that the Niagara fourteen-point engagement sleeve clutches with built-in single-stroke mechanism, previously described in *MACHINERY*, are now standard equipment on all Niagara single-gear double-crank presses up to and including 5-inch diameter shafts.

H. J. FRENCH, in charge of alloy steel and iron development for the International Nickel Co., Inc., 67 Wall St., New York City, spoke before the Columbus chapter of the American Society for Metals, March 9, before the Dayton chapter, March 10, and before the Cincinnati chapter, March 11 on the more interesting phases of the year's progress in the manufacture, selection, and utilization of alloy steels.

SYDNEY BUCKLEY, president of the Shepard Niles Crane & Hoist Corporation, Schuyler Ave., Montour Falls, N. Y., has been elected chairman of the Electric Hoist Manufacturers' Association. J. F. COOKE, sales manager of electric

hoists for the American Engineering Co., Philadelphia, Pa., has been elected vice-chairman.

HIGH SPEED HAMMER CO., Rochester, N. Y., at its annual meeting elected the following officers: F. W. MARCELLUS, president and general manager; VICTOR BROOK, executive vice-president; H. M. STARKE, vice-president in charge of eastern sales; and CHARLES HARLE, secretary and treasurer.

E. LEITZ, INC., has removed the firm's headquarters in New York from 60 E. 10th St. to the Heckscher Bldg., 730 Fifth Ave. A well equipped machine shop is available in the new quarters for repairing and servicing all optical instruments handled by the firm.

R. W. ORTH, for the last five years connected with the News Bureau of the General Electric Co., Schenectady, N. Y., has joined the editorial staff of *Product Engineering*, New York City.

BUNTING BRASS & BRONZE CO., Toledo, Ohio, has removed its New York City branch to new and larger quarters at 155 Baxter St., near Grand St., New York City.

ARTHUR E. GAYNOR has been appointed manager of the New York branch of the John A. Roebling's Sons Co., succeeding the late W. P. Bowman.

Ohio

WHITE MOTOR CO., Cleveland, Ohio, due to the tremendous increase in the company's business during the past year, has entered upon an expansion program calling for the expenditure of more than \$2,000,000 within the next eighteen

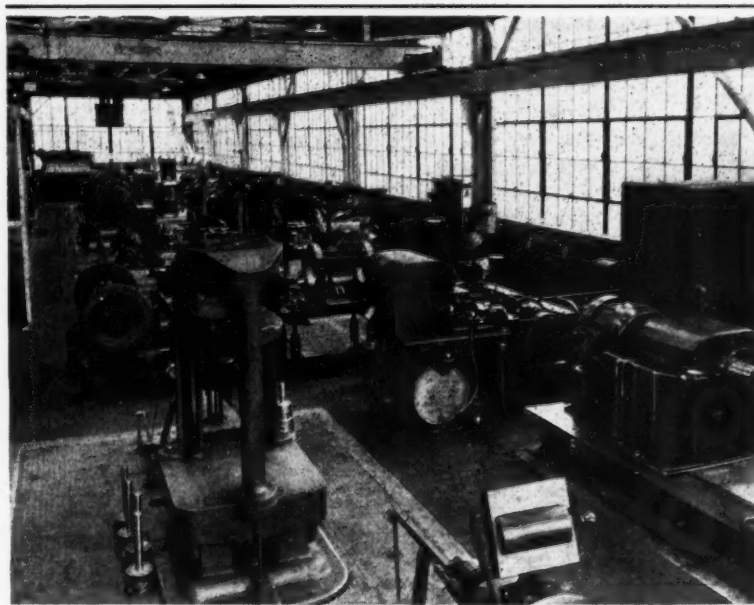
months, for building construction, machinery, and tools. Of this sum, upward of \$1,500,000 will be used for new machinery, precision tools, heat-treating equipment, and construction of a new research laboratory and testing plant.

OSTER MFG. CO., Cleveland, Ohio, at a meeting of the board held March 5 elected R. B. TEWKSBURY chairman of the board; ROGER TEWKSBURY, president and treasurer; ARTHUR S. GOULD, vice-president; and HARRY A. MAURER, secretary. The first three formerly acted in the capacities of president, vice-president, and secretary, respectively, while Mr. Maurer was general superintendent of the company's plants at Erie, Pa., and Cleveland, Ohio.

MONARCH MACHINE TOOL CO., Sidney, Ohio, recently let a contract for an addition to its machining division which will add 18,000 square feet to the floor space. The building, of monitor type construction, has a center bay served by a 50-foot span 10-ton crane. About \$100,000 worth of machine tool equipment has been ordered to be installed in the new building.

FRANKLIN G. SMITH recently completed forty-five years as the executive head of the Osborn Mfg. Co., Cleveland, Ohio. On this occasion, many of Mr. Smith's friends in the industrial, financial, legal, and educational fields in Cleveland joined in honoring him at a luncheon given to commemorate his many years of successful work in one of the nation's key industries.

TIMKEN ROLLER BEARING CO., Canton, Ohio, has greatly expanded its research and testing facilities. New quarters and additional equipment, much of it of unusual character, have been provided, making the laboratory one of the most



**General View of the Main Room of the New Testing
Laboratory of the Timken Roller Bearing Co.**



The growth of industry and the development of new products have brought pressing needs for tools of character. Cincinnati Shapers have won an envied place among the Master Tools of Industry. The Cincinnati Shear is built by the makers of Cincinnati Shapers and Cincinnati Brakes. It is a shear built in a machine tool plant with machine tool refinements . . . it is a machine tool for shearing metal.

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THE CINCINNATI SHAPER COMPANY, CINCINNATI, OHIO

completely equipped of its kind in the United States. It is housed in a single-story brick building 150 by 80 feet.

FOSTER WHEELER CORPORATION, 165 Broadway, New York City, has appointed HOWARD B. HALL regional director in charge of the Cleveland, Cincinnati, and Pittsburgh territories, with headquarters at 526 Superior Ave., Cleveland, Ohio. Mr. Hall's experience covers a wide range of industrial activity.

LINCOLN ELECTRIC CO., Cleveland, Ohio, announces that its Cincinnati office has been removed from 5th and Baymiller Sts., to Room 602, American Bldg., Central Parkway at Walnut St. F. H. SMITH and E. T. GREGORY will be available for consultation on any problem involving the application and use of welding.

TAYLOR-WINFIELD CORPORATION, Warren, Ohio, announces that T. S. LONG has been appointed assistant sales manager, and W. H. MARION, purchasing agent, at the Warren, Ohio, plant. J. D. ANDERSON has been appointed purchasing agent at the Detroit, Mich., plant.

WATSON-STILLMAN CO., Roselle, N. J., builder of hydraulic machinery, has

opened a sales office at 83 S. High St., Columbus, Ohio, with JOHN C. GRINDLAY in charge. The Kentucky, southern Ohio, and southern Indiana territories will be covered from this office.

W. J. FENWICK, who for several years has been co-manager of the Cleveland territory for the Black & Decker Mfg. Co., Towson, Md., has been appointed manager of the Cleveland branch.

Pennsylvania

J. GUY GRIFFITH CO., formerly located at 406 Nixon Bldg., Pittsburgh, Pa., has moved to the Union Trust Bldg. of that city. The company represents the Hill Clutch Machine & Foundry Co. of Cleveland, Ohio, manufacturer of power transmission equipment, and also the Cleveland Knife & Forge Co., manufacturer of shear blades and slitting cutters.

AJAX FLEXIBLE COUPLING CO., Westfield, N. Y., has moved its Pittsburgh sales office to 970-B Union Trust Bldg., Pittsburgh, Pa. J. Guy Griffith Co. represents the company in that territory.

leum products in pipe lines, pump speed curves, pressure-temperature curves for pumping hot water, and a chart showing the resistance of valves and fittings to the flow of fluids. Recommendations of materials to be used in pumps handling various liquids are also included, together with instructions for installing and operating different styles of pumps. The book is divided into seven sections designated as follows: General; Centrifugal Pumps; Rotary Pumps; Reciprocating Pumps; Deep Well Turbine Pumps; Test Codes; and Data.

A.S.T.M. TENTATIVE STANDARDS (1936). 1390 pages, 6 by 9 inches. Published by the American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa. Price, cloth-bound, \$8; paper-bound, \$7.

This edition of A.S.T.M. Tentative Standards contains 264 tentative specifications, methods of testing, and definitions of terms covering widely used engineering materials. The standards embrace ferrous metals, non-ferrous metals, non-metallic minerals, miscellaneous materials, and general testing methods. A large number of the standards are included in this publication for the first time, having just been approved during 1936, and a number that were revised during the year are given in their latest approved form.

CIRCULAR AND DOVETAIL FORMING TOOL BLANKS (American Standard B5.7). 8 pages, 8 by 10 1/2 inches. Published by the Society of Automotive Engineers, National Machine Tool Builders' Association, and American Society for Mechanical Engineers, 29 W. 39th St., New York City. Price, 40 cents.

NEW BOOKS AND PUBLICATIONS

HOW TO WELD TWENTY-NINE METALS. By Charles H. Jennings. 100 pages, 5 1/4 by 8 1/4 inches. Published by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Price, 50 cents.

The author of this book is engineer in charge of welding research for the Westinghouse Electric & Mfg. Co., and in this capacity has long been intimately identified with arc welding development. In this work, he has conducted exhaustive investigations into the joining of metals by the electric arc, both from theoretical and practical points of view. He also supervises all electric welding in the many Westinghouse factories. In this capacity, he served as consulting engineer on welding in the design of the Boulder Dam gates. He is therefore well qualified to prepare an authoritative book on the welding of all types of metals. The present book contains much information which will iron out difficulties that have troubled many welding operators when confronted with new problems. The information is given in great detail, and drawings and diagrams are used to illustrate the procedure whenever necessary.

MATERIALS HANDBOOK. By George S. Brady. 661 pages, 4 1/2 by 7 inches. Published by the McGraw-Hill Book Co., Inc., New York City. Price, \$5.

This is the third edition of a work originally published in 1929. Without departing from the original intention to give the purchasing agent and industrial executive quick reference data that will aid them in distinguishing and selecting materials, the items relating to engineering construction materials have been amplified to include enough comparative data on the physical properties to enable the designing engineer and the architect to judge the relative merits of the particular material for the requirement in hand. It is not the intention of this work to provide a metallurgical handbook or an exhaustive treatise on any particular material. Instead, it is intended as a reference guide in selecting the most economic material for a particular use. General information on the chief ores and most important industrial chemicals has also been included.

STANDARDS OF HYDRAULIC INSTITUTE. 155 pages, 8 1/2 by 11 inches. Published by the Hydraulic Institute, 90 West St., New York City. Price, \$1.

This is the seventh edition of the standards for the pump industry, published by the Hydraulic Institute. The new edition has been completely rewritten, rearranged, and enlarged. Among the added material is a new pump test code, charts for figuring friction of petro-

COMING EVENTS

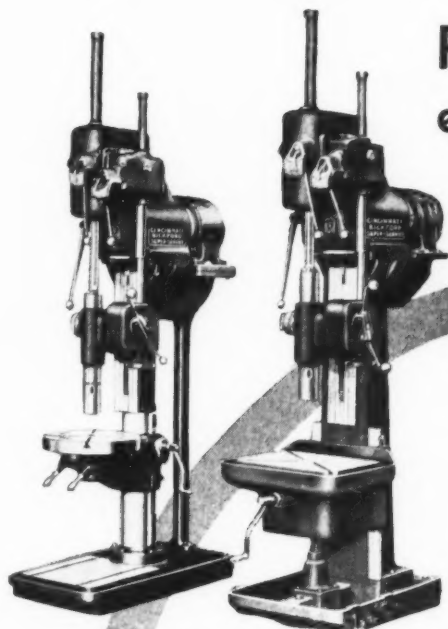
APRIL 9-10—NEW ENGLAND FOUNDRY AND CASTING ENGINEERING CONFERENCE at the Massachusetts Institute of Technology, Cambridge, Mass., under the auspices of the New England Foundrymen's Association, the American Foundrymen's Association, and the Massachusetts Institute of Technology. Chairman of conference, R. F. Harrington, Hunt-Spiller Mfg. Co., Boston, Mass.

APRIL 13-15—Eighth annual convention of the GREATER NEW YORK SAFETY COUNCIL at the Hotel Astor, New York City. Julien H. Harvey, executive vice-president, 60 E. 42nd St., New York City.

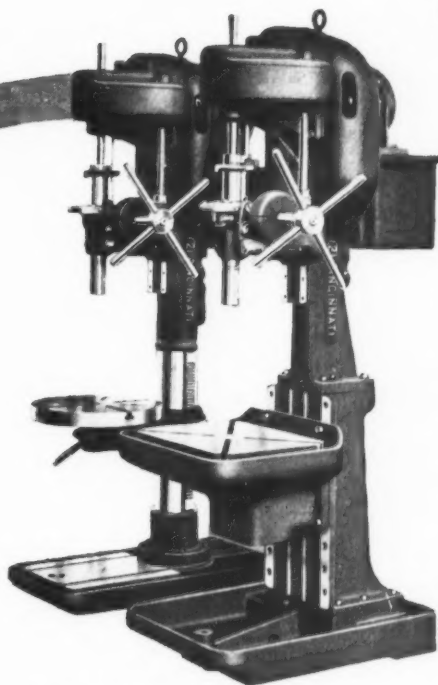
APRIL 15-16—Regional Transportation and Maintenance Meeting of SOCIETY OF AUTOMOTIVE ENGINEERS at Balti-

"More Holes per Dollar"

Prove it in your own factory as practically every Automotive Plant is doing—both in
**Production Lines
and Tool Shops**



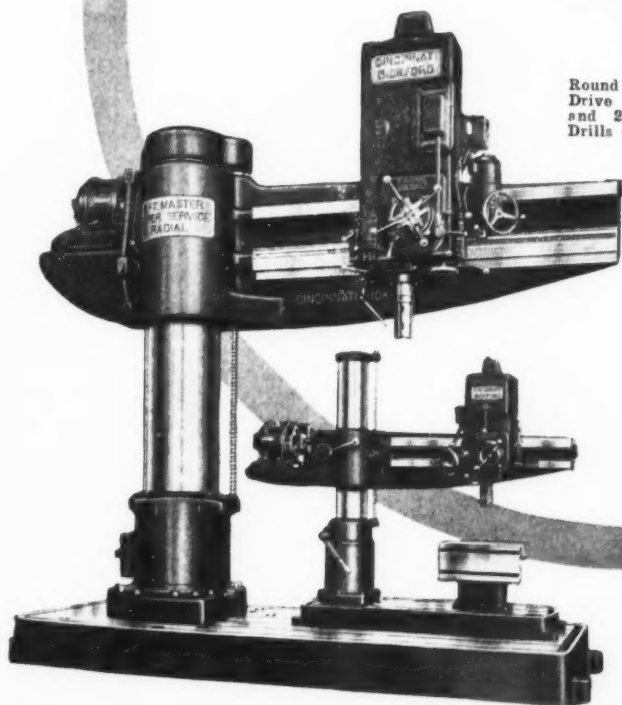
21", 24" and 28" Super-Service Uprights, round and box column types, set a new standard for convenience, stamina, accuracy and general production efficiency. One modern improvement is the elimination of all friction clutches. Be sure to get details of this new design.



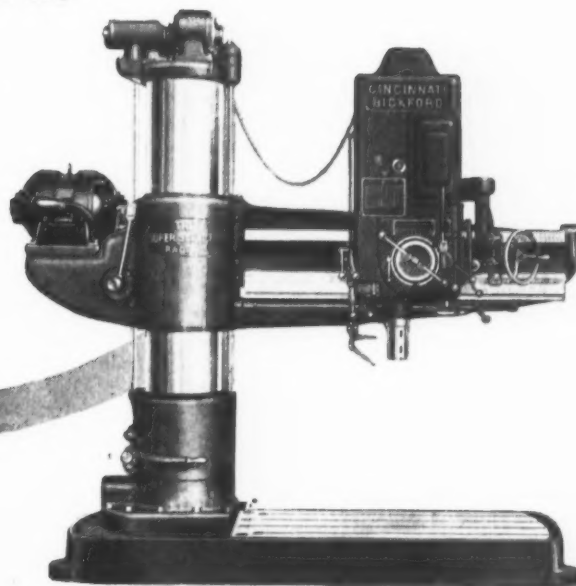
Round and Box Column Direct Drive Uprights—Built in 21" and 24" Sizes. — And Gang Drills of all Types.

No matter what your drilling requirements, whether high production or small quantities, you can save drilling time and money by installing a Cincinnati Bickford drill. 63 years of specializing on metal drilling machinery qualifies us to help you in selecting the proper drilling machine for your work.

Write for latest catalogs



A size comparison between the 8' machine with 22" diameter column and the 4' High Speed Super-Service radial having 9" diameter column. These are neither the largest or the smallest Cincinnati Bickford radial drills.



THE SUPER SERVICE RADIAL
3 Ft. to 8 Ft. Sizes. Centralized Low Control. Write for detailed information.

THE CINCINNATI BICKFORD TOOL CO.
OAKLEY CINCINNATI OHIO. U.S.A.

more, Md. John A. C. Warner, secretary and general manager, 29 W. 39th St., New York City.

APRIL 19-22—SECOND MACHINE TOOL ELECTRIFICATION FORUM at the Works of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

APRIL 19-24—Second International Congress of the INTERNATIONAL ASSOCIATION FOR TESTING MATERIALS to be held in London, England. K. Headlam-Morley, honorary secretary, 28 Victoria St., London, S.W. 1, England.

APRIL 21-23—National Tractor Meeting of SOCIETY OF AUTOMOTIVE ENGINEERS, Pere Marquette Hotel, Peoria, Ill. John A. C. Warner, secretary and general manager, 29 W. 39th St., New York City.

MAY 3-7—Forty-first annual convention and exposition of the AMERICAN FOUNDRYMEN'S ASSOCIATION in Milwaukee, Wis. C. E. Hoyt, executive secretary-treasurer, 222 W. Adams St., Chicago, Ill.

MAY 4-9—Summer meeting of SOCIETY OF AUTOMOTIVE ENGINEERS at the Greenbrier Hotel, White Sulphur Springs, W. Va. John A. C. Warner, secretary and general manager, 29 W. 39th St., New York City.

MAY 17-21—Spring meeting of the AMERICAN SOCIETY OF MECHANICAL ENGINEERS at Detroit, Mich., with headquarters at the Hotel Statler. C. E. Davies, secretary, 29 W. 39th St., New York City.

MAY 24-27—Twenty-second annual convention of the NATIONAL ASSOCIATION OF PURCHASING AGENTS at the William Penn Hotel, Pittsburgh, Pa. G. A. Renard, executive secretary-treasurer, 11 Park Place, New York City.

JUNE 28-JULY 3—Fortieth annual meeting of the AMERICAN SOCIETY FOR TESTING MATERIALS AND FOURTH EXHIBIT OF TESTING APPARATUS AND RELATED EQUIPMENT at Waldorf-Astoria Hotel, New York City. Headquarters of Society, 260 S. Broad St., Philadelphia, Pa.

SEPTEMBER 23-25—Conference of the NATIONAL INDUSTRIAL ADVERTISERS ASSOCIATION at Edgewater Beach Hotel, Chicago, Ill. For further information address National Industrial Advertisers Association, Inc., 100 E. Ohio St., Chicago, Ill.

OCTOBER 4-9—POWER AND MECHANICAL ENGINEERING EXPOSITION at the International Amphitheatre, Chicago, Ill.

OCTOBER 27-NOVEMBER 3—NATIONAL AUTOMOBILE SHOW, at Grand Central Palace, New York City, under the auspices of the Automobile Manufacturers Association, 366 Madison Ave., New York City.

OBITUARIES

Robert Thompson Hazelton

Robert Thompson Hazelton, treasurer and works manager of the Cincinnati Shaper Co., Cincinnati, Ohio, for the last eighteen years, died of a heart attack on March 3. Mr. Hazelton was born in Petosky, Mich., in 1883. He was edu-



Robert T. Hazelton

cated in Rochester, N. Y., and entered the mechanical field at the plant of the Bridgeford Lathe Co., Rochester. In 1911, he went to Cincinnati, where he was first associated with the Cincinnati Milling Machine Co. Later he became connected with the Cincinnati Shaper Co. as treasurer and works manager. He was known throughout the country for his designing ability and for his development of machine tools and equipment for use in the metal-working field. His death is a distinct loss to industry.

Mr. Hazelton was a member of the American Society of Mechanical Engineers and of the Engineers' Club of Cincinnati, of which he was a director. He is survived by his widow, Lydia Duncan Hazelton, two sons, and two daughters.

Elihu Thomson

Elihu Thomson, scientist and pioneer in electrical development, died at his home in Swampscott, Mass., March 13, at the age of eighty-three years. Dr. Thomson was one of the pioneers in the field of electrical science. He held not less than eight hundred patents and has been honored by scientific societies and institutions the world over. He com-

bined in a most remarkable way the constructive powers of the inventor, the thoroughness of the man of science, and the penetrating thinking of the philosopher. During the early days of the practical application of electricity, he was engaged in inventions that helped to perfect the arc light. Fifty years ago he originated the resistance method of electric welding. His contributions to the development of the electric motor were outstanding, and in practically every branch of the electrical field he made noteworthy contributions.

In 1883, he was the principal organizer of the Thomson-Houston Electric Co., which was merged with the Edison General Electric Co. to form the General Electric Co. Ever since, he had been associated with the General Electric Co. at Lynn, Mass.

Dr. Thomson was born in Manchester, England. His father, a Scotsman, was a skilled engineer and mechanic. When Elihu Thomson was five years old, the family came to the United States and settled in Philadelphia, where he received his education. In 1876, when only twenty-three years old, he was appointed to teach chemistry and physics at the Central High School of Philadelphia.

Dr. Thomson was the only scientist in the world who had been awarded all three of the great prizes of the English scientific and engineering world. In 1916, he received the Hughes medal from the Royal Society of London. In 1924, he was awarded the Kelvin medal, one of the most cherished of distinctions, and in 1927, he received the Faraday medal from the Institution of Electrical Engineers.

WARREN H. JONES, secretary, assistant treasurer, and director of the Westinghouse Electric & Mfg. Co., died of pneumonia recently at the age of sixty-one. Mr. Jones was born in Amherst, Mass. After having been employed for some time by the Rock Island Railroad, he joined the Westinghouse organization, with which he has been connected for twenty-six years.

HARRY E. SHELDON, president and founder of the Allegheny Steel Co., Brackenridge, Pa., died February 10.

* * *

French Firm Wishes to Represent American Manufacturers

A well-known French dealer in tools, steels, and other cutting materials, is in a position to represent, in France, American manufacturers of metal-cutting saws, drills, files, boring tools, and milling cutters, and to eventually manufacture patented tools under license in France. The firm also is in a position to represent manufacturers of tool steels and high-speed cutting tool materials. The firm can be reached by addressing MACHINERY, 148 Lafayette St., New York.

ELMER H. NEFF, on April 17, completed his fortieth year as New York representative, first of the Brown & Sharpe Mfg. Co., Providence, R. I., and then of the subsidiary company, Brown & Sharpe of New York, Inc. On that anniversary, he relinquished charge of the New York City office and retired from active service. Until further notice, the New York City office will be under the direction of ARNOLD K. BROWN.

AMERICAN CUTTING ALLOYS, INC., 500 Fifth Ave., New York City, announces that Dr. Ing. Paul Schwarzkopf of Reutte, Austria, has become president of the company. Dr. Schwarzkopf is well known for his pioneering work in the field of cemented carbides. He is planning to spend at least six months of the year in this country, and while here, will make his headquarters at Lewiston, Me., where the company has its plant and laboratory.

THE LINDE AIR PRODUCTS CO., UNIT OF UNION CARBIDE & CARBON CORPORATION, 205 E. 42nd St., New York City, announces the opening of a new Prest-O-Lite acetylene plant at 2330 Armistead Bridge Road, Norfolk, Va. A new oxygen plant has been opened at Essington, Pa., near Philadelphia, on Powhattan Ave.

RUSSELL, HOLBROOK & HENDERSON, INC., dealers in machine tools and special and automatic machinery, have moved to 99 Hudson St., New York City.

Ohio

OESTERLEIN MACHINE CO., 1653 Hamer St., Cincinnati, Ohio, has been reorganized by Charles Oesterlein and some of his associates who were formerly with the Oesterlein interests in Cincinnati. The new company has acquired title to the assets of the former Oesterlein Machine Co. and will engage in the development and building of tilted offset milling machines. The company is prepared to give prompt attention to replacement part orders for Oesterlein tilted rotary and tilted offset millers.

W. F. ANDERSON, St. Louis, Mo.; M. C. BELLAMY, Seattle, Wash.; G. W. CURTIS, Milwaukee, Wis.; H. V. FLEMING, Birmingham, Ala.; B. E. KEIFER, Cincinnati, Ohio; H. D. ROBB, Pittsburgh, Pa., and B. M. TINLIN, Huntington, W. Va., have been appointed district managers in charge of steel sales for the Steel and Tube Division of the Timken Roller Bearing Co., Canton, Ohio.

HANNIFIN MFG. CO., 621-631 S. Kolmar Ave., Chicago, Ill., has purchased the machinery, equipment, and name of the JOHN F. ALLEN CO., of New York, maker of air-operated riveting machines. Manufacture, sales, and service of Allen riveting machines will be continued as the ALLEN RIVETER WORKS, DIVISION OF

HANNIFIN MFG. CO., at St. Marys, Ohio. The Hannifin Mfg. Co. has recently completed a new plant at St. Marys, equipped for the production of large machinery.

EDMOND C. POWERS has been appointed assistant secretary of the James F. Lincoln Arc Welding Foundation, Cleveland, Ohio, which Foundation sponsors the \$200,000 prize contest recently announced in the technical press. For the last three years, Mr. Powers has been engaged in technical writing for the Lincoln Electric Co., of Cleveland.

BUSCH-LAWRENCE, INC., 1012 Elm St., Cincinnati, Ohio, has been organized to sell material-handling equipment, such as wheelbarrows, two-wheeled trucks, platform trucks, trailer trucks, casters, conveyors, etc.

RALPH K. ULRICH has been appointed manager of the Cash Register Division of the Ohmer Register Co., Dayton, Ohio, and HOWARD S. MARTS has been made assistant manager.

Pennsylvania

J. K. PORTER Co., Union Trust Bldg., Pittsburgh, Pa., has been appointed agent covering the western Pennsylvania territory of the Newark Wire Cloth Co., Newark, N. J., manufacturer of woven wire screens and wire cloth products.

DAVID W. JENKINS, who has been with Henry Disston & Sons, Inc., Philadelphia, Pa., for more than forty years as salesman, sales manager, branch manager, and for the last ten years as general sales manager, has been appointed to the chairmanship of the Hardware



David W. Jenkins, Recently Appointed Chairman of Hardware Section at Rotary International Convention

Section at the Rotary International Convention, which will be held at Nice, France, starting June 9. Mr. Jenkins, accompanied by his wife, sails for Europe May 26 on the *Volendam*.

JACKSON GEAR CO., 31st St. and Liberty Ave., Pittsburgh, Pa., has been organized to manufacture a complete line of all types of gears for general industrial use. The executives of the company will be JOHN J. JACKSON, one of the founders of the Pittsburgh Gear & Machine Co., J. HARPER JACKSON, secretary and sales manager of the same company, and STANLEY J. JACKSON, previously in charge of production of the Pittsburgh Gear & Machine Co.

E. P. "NED" CRAWFORD has been appointed factory representative in the Pennsylvania territory for the Billings & Spencer Co., Hartford, Conn., manufacturer of forged tools, commercial drop-forgings, drop-forging hammers, and die-making machinery. Mr. Crawford will make his headquarters in Philadelphia.

P. H. HOLTON has joined the sales engineering personnel of the Philadelphia office of Carboloy Co., Inc., 2987 E. Jefferson Ave., Detroit, Mich., manufacturer of cemented-carbide tools, dies, and wheel-dressers. Mr. SCHONBERGER, formerly of the Philadelphia office, has been transferred to the Newark office.

WILLIAM SIVYER and B. B. ROSS have joined the sales staff of the Philadelphia office, at 401 N. Broad St., of the Lincoln Electric Co., Cleveland, Ohio.

* * *

Gear Manufacturers Will Meet in May

The American Gear Manufacturers Association will hold its twenty-first annual meeting at the Galen Hall Hotel, Wernersville, Pa., May 24 to 25. A program covering many phases of the industry is planned.

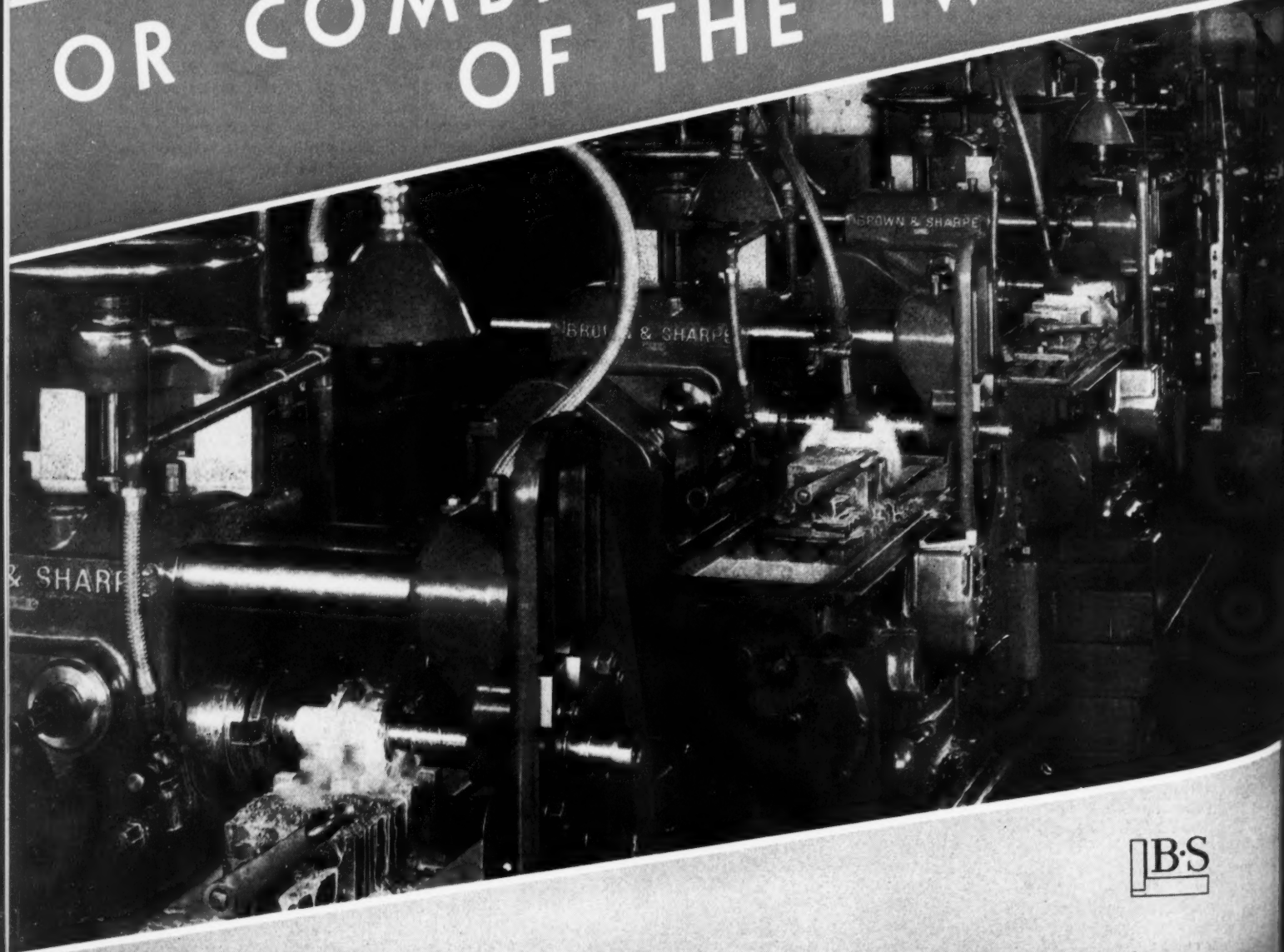
Among the papers that will be presented are the following: "Meehanite Cast Iron," by O. Smalley, president Meehanite Institute of America; "Casting Steel in Concrete Molds," by H. F. Scatchard, Birdsboro Steel Foundry and Machine Co.; "Automobile Transmissions," by J. O. Almen, Dynamics Division, Research Laboratories, General Motors Corporation; "Application Factors for Helical and Herringbone Speed Reducers," by S. L. Crawshaw, application engineer, Westinghouse Nuttall Works; "Plant Management," by N. M. DuChemin, assistant manager, West Lynn Works, General Electric Co.; "Wage Incentives," by Neal Foster, Boston Gear Works, Inc.; "Foremen and Foremen's Training," by H. H. Kerr, president, Boston Gear Works, Inc.; and "Credit Unions," by E. S. Sawtelle, vice-president and general manager, Tool Steel Gear and Pinion Co.

CLIMB MILLING



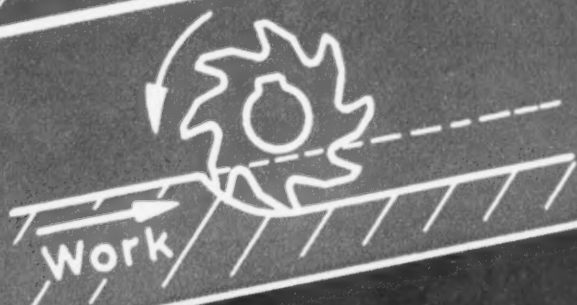
CONVENTIONAL MILLING

OR COMBINATION
OF THE TWO



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BROWN &



...ALL ON THE
BROWN & SHARPE
No. 12 Electrically Controlled
PLAIN MILLING MACHINE

There are Several Ways to Mill Any Job
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Investigate its advantages! Brown & Sharpe Mfg. Co., Providence, R. I., U. S. A.

Page 686-C

SHARPE

OBITUARIES

E. P. Burrell

E. P. Burrell, director of engineering of the Warner & Swasey Co., Cleveland, Ohio, died in that city Sunday, March 21, after an illness of less than a week.

Mr. Burrell was born at Hall, N. Y., in 1871. He graduated from Cornell University where, in 1898, he received

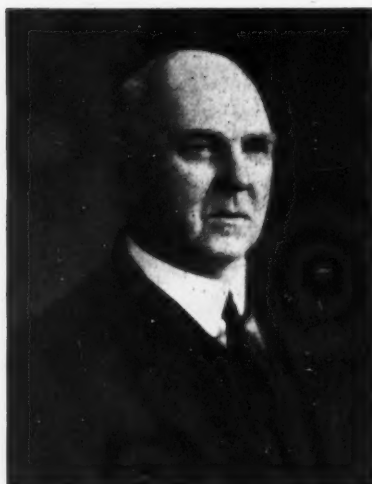


Photo by Standiford

E. P. Burrell

the degree of mechanical engineer, and the next year, his master's degree in mechanical engineering. Following his graduation, he became connected with the Warner & Swasey Co., with which concern he has been associated ever since. He was well known in the entire mechanical field as an outstanding designer of both telescopes and turret lathes.

One of his early accomplishments in the telescope field was in connection with the development of a range-finder, a mechanism that compensates for the bending of light rays in the atmosphere. Later he performed valuable work in connection with range-finders for the Coast Artillery. During the long period of years that he was with the Warner & Swasey Co. he worked on more than twenty great telescopes and domes, including the McDonald observatory and telescope and the 72-inch reflector of the Observatory at Victoria, B. C. Telescopes designed by him are erected in South America, in Japan, and in many places on the North American continent.

His other great engineering achievements were connected with outstanding improvements in turret lathes. Many of the important developments in these machines over a long period of years were due to Mr. Burrell's imagination and initiative.

He was a member of the American

Society of Mechanical Engineers and of the Cleveland Engineering Society. In June, last year, the Case School of Applied Science conferred upon him the honorary degree of doctor of engineering.

Carl B. Auel

Carl B. Auel, for many years manager of the Employees' Service of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and a nationally known leader in industrial relations and industrial safety activities, died at his home in Irwin, Pa., on April 4, following a brief illness.

Mr. Auel was born in Brooklyn, N. Y., in 1870. He attended the Brooklyn Polytechnic Institute, Columbia University School of Mines, and Sibley College at Cornell University, from which he was graduated in 1892 with the degree of mechanical engineer. He joined the Westinghouse organization in 1893, and after serving an apprenticeship course, became a member of the works department.

Soon he was placed in charge of production, and later became manager of the railway and control departments, then assistant manager of works and director of standardization of company activities. During this period he was also assistant general manager of the British Westinghouse Co. located at Trafford Park in England. He spent about four years abroad, returning to this country in 1917, when he became manager of employees' activities. From that time on, his career broadened into industrial relations channels.

Francis F. Prentiss

Francis F. Prentiss, chairman of the board of directors of the Cleveland Twist Drill Co., Cleveland, Ohio, died of pneumonia at his winter home in Pasadena, Calif., on April 1. Mr. Prentiss had been in ill health for several months prior to his death. He was seventy-eight years of age. Mr. Prentiss became associated with what is now the Cleveland Twist Drill Co. in the summer of 1880. The business was founded by the late Jacob D. Cox in 1874. It was not long before Mr. Prentiss became the star salesman of the organization in America. Later he personally laid the foundation for the sale of Cleveland tools in Europe, South America, Australia, Asia, and other parts of the world. Several years prior to his death, Mr. Prentiss had retired from active management of the company in order to give his time to a wide range of civic affairs and philanthropies.

Waddel P. Andrus

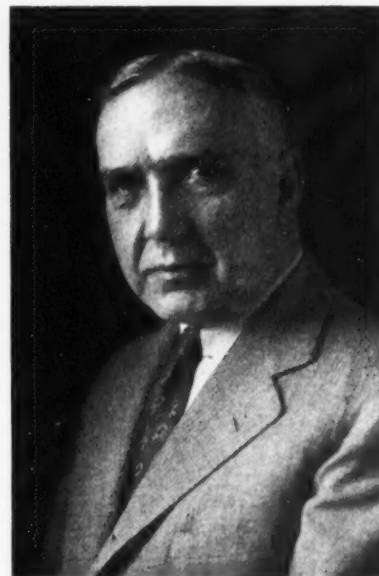
Waddel P. Andrus, chairman of the board of directors of the High Speed Hammer Co., Rochester, N. Y., died recently of cerebral hemorrhage at the age of seventy. Mr. Andrus was born in Oxford, Miss., and became a registered

pharmacist. He had a natural bent for sales and merchandising and spent much of his life in that work. Eighteen years ago he purchased an interest in the High Speed Hammer Co., becoming its principal owner five years later.

William H. Miller

William H. Miller, manager of the agency sales department of the Pratt & Whitney Division of the Niles-Bement-Pond Co., and associated with the Pratt & Whitney organization for forty-seven years, died suddenly in Unionville, Conn., on March 26, of coronary thrombosis.

Mr. Miller was born in Liverpool, England, sixty-seven years ago and came to this country with his family when he was twelve years old. He entered the employ of the Pratt & Whitney Co. on June 30, 1890, as an apprentice. For some years he was in the engineering department, later being made manager of the foreign sales department, which position he held for some time. He then became sales manager for the entire company, and in this capacity came to be known and loved by many for his ability, splendid character, and sympathetic understanding. He had friends in all parts of the world. For the last



William H. Miller

three years he had been manager of the agency sales department. Mr. Miller is survived by his wife, a daughter, a son, and eight grandchildren.

HORACE C. PUTNAM, president of the Kelly Reamer Co., Cleveland, Ohio, died March 21 in Cleveland, after an illness of about a year. He acquired an interest in the company in 1919 and became president in 1920.

HORACE S. WILKINSON, chairman of the Crucible Steel Co. of America died on April 11 at the age of sixty-eight.

The Aristocrat of Bearings



Each bearing a *masterpiece*
of
giant strength and precision
HOOVER
BALL AND TAPERED ROLLER
BEARINGS

HOOVER
BALL AND
BEARING
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•

MICHIGAN

NEW BOOKS AND PUBLICATIONS

TOOL STEEL SIMPLIFIED. By Frank R. Palmer. 316 pages, 6 by 9 inches; 203 illustrations, 28 tables. Published by the Carpenter Steel Co., Reading, Pa. Price, \$1 in the United States; \$3.50 elsewhere.

This book, prepared by a man of long and thorough experience in the tool steel field, is addressed to the men in the industry who are responsible for the design, making, and heat-treatment of tools. It meets a distinct need in the metal-working industries, since a thorough, up-to-date book on this subject has long been wanted. It is actually the first book of its kind especially intended for toolmakers and tool supervisors. The book is also well suited for use as a textbook in trade and industrial schools, for apprentices, and for students of mechanical engineering in general. The purpose of the book is to present simplified methods for the selection and heat-treatment of tool steel to obtain the best results in tools.

As stated in the book, the formula for a good tool is (1) proper design; (2) accurate toolmaking; (3) the right tool steel; and (4) correct heat-treatment. If any one of these is unsatisfactory, the tool is unsatisfactory. While the first two requirements are taught to toolmakers from the very beginning of their apprenticeship, the last two are seldom taught and must be acquired through practical experience, if at all. It is the purpose of this book to cover specifically the last two requirements.

An idea of the contents of this book may be obtained from the chapter heads: Tool Steel Terms; Tool Steel—What It Is; The Analysis of Tool Steel; The Soundness of Tool Steel; The Timbre (Personality) of Tool Steel; The Matched Set Method; The Nine Matched Tool Steels; The Matched Set Method in Use; Heat-Treating Methods and Equipment; Hardness and Toughness Testing; Properties and Heat-Treatment of Nine Matched Tool Steels; Relation of Design to Heat-Treatment; The Hot Acid Etch Test; The Timbre Test; Spark Testing; Furnace Atmosphere; Quenching; and Trouble Shooting.

LABOR'S SEARCH FOR MORE. By Malcolm Keir. 527 pages, 5 3/4 by 8 1/2 inches. Published by the Ronald Press Co., 15 E. 26th St., New York City. Price, \$3.50.

This book is particularly timely, in view of the current industrial unrest, manifested in strikes throughout the country. The author, who is professor of economics at Dartmouth College, has made a careful study of the struggle of labor to improve its lot and of the various factors influencing its present condition. He merely presents a historical

record of facts, and does not attempt to inject his personal opinions. It is hoped that this record will help business executives to understand the feelings and aspirations of wage-earners more clearly and assist in solving one of our most pressing social problems.

The study starts with a consideration of the bases of production—land, capital, management, and labor—and discusses "free land" (or the land frontier); immigration; women as wage-earners; child labor; the concentration of wealth and income; corporate production; national bank system; and technology of production. It then takes up unions, strikes, employers' activities, methods for industrial peace, labor legislation and court decisions, labor in politics, radicalism among farmers and industrial workers, martyrs, conditions among southern workers and negroes.

COMING EVENTS

MAY 3-7—Forty-first annual convention and exposition of the **AMERICAN FOUNDRYMEN'S ASSOCIATION** in Milwaukee, Wis. C. E. Hoyt, executive secretary-treasurer, 222 W. Adams St., Chicago.

MAY 4-9—Summer meeting of **SOCIETY OF AUTOMOTIVE ENGINEERS** at the Greenbrier Hotel, White Sulphur Springs, W. Va. John A. C. Warner, secretary and general manager, 29 W. 39th St., New York City.

MAY 12-13—Meeting of **REFRIGERATING MACHINERY ASSOCIATION** at Hot Springs, Va. Office of the Association, Southern Bldg., Washington, D. C.

MAY 14-15—Annual meeting of the **AIR CONDITIONING MANUFACTURERS' ASSOCIATION** at Hot Springs, Va. Office of the Association, 915 Southern Bldg., Washington, D. C.

MAY 17-21—Spring meeting of the **AMERICAN SOCIETY OF MECHANICAL ENGINEERS** at Detroit, Mich., with headquarters at the Hotel Statler. C. E. Davies, secretary, 29 W. 39th St., New York City.

MAY 24-25—Twenty-first annual meeting of the **AMERICAN GEAR MANUFACTURERS' ASSOCIATION** at Galen Hall Hotel, Wernersville, Pa. J. C. McQuiston, manager-secretary, Penn Lincoln Hotel, Wilkesburg, Pa.

MAY 24-27—Twenty-second international convention of the **NATIONAL ASSOCIATION OF PURCHASING AGENTS, INC.**, at Pittsburgh, Pa. Further information can be obtained from Thomas D. Jolly, Aluminum Co. of America, Pittsburgh, Pa.

MAY 27-28—Ninth annual convention of the **NATIONAL METAL TRADES ASSOCIATION** at the Palmer House Hotel, Chicago, Ill. Secretary, Harry S. Flynn, Peoples Gas Bldg., Chicago.

JUNE 18-26—**ECONOMICS CONFERENCE FOR ENGINEERS** at the Stevens Engineering Camp, Johnsonburg, Warren County, N. J. For further information, address Dr. Harvey N. Davis, president, Stevens Institute of Technology, Hoboken, N. J.

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OCTOBER 7-9—National Aircraft Production Meeting of **SOCIETY OF AUTOMOTIVE ENGINEERS** at Los Angeles, Calif. John A. C. Warner, secretary and general manager, 209 W. 39th St., New York City.

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OCTOBER 27-NOVEMBER 3—**NATIONAL AUTOMOBILE SHOW**, at Grand Central Palace, New York City, under the auspices of the Automobile Manufacturers Association, 366 Madison Ave., New York City.

NEWS OF THE INDUSTRY

Illinois

M. E. CLARK has been appointed sales manager of Randall Graphite Products Corporation, Chicago, Ill., manufacturer of graphite bronze bushings and pillow blocks. Mr. Clark was with the Bunting Brass & Bronze Co., Toledo, Ohio, for eleven years, having served as manager of many of the company's branches, and more recently was associated with Drying Systems, Inc., Chicago, Ill., as assistant engineer in charge of air conditioning.

HYMAN BORNSTEIN, director of testing and research laboratories of Deere & Co., Moline, Ill., was elected president of the American Foundrymen's Association at the annual meeting. Mr. Bornstein has been active in the Association for many years, serving as chairman of numerous committees. He also served as a director of the Association from 1932 to 1935. He is recognized as a leading authority on cast iron.

THEODORE S. SEE, formerly works manager of the La Salle Steel Co., Palmolive Bldg., Chicago, Ill., manufacturer of cold-finished carbon and alloy steel bars, has been elected vice-president in charge of operations.

PHILLIP K. McCULLOUGH has been appointed advertising manager of the Mercury Mfg. Co., 4118 S. Halsted St., Chicago, Ill.

Michigan

O. W. YOUNG has been appointed general manufacturing manager of the Buick Motor Division of the General Motors Corporation, Flint, Mich., succeeding the late Charles T. Scannell. Mr. Young advances to the head of all Buick manufacturing operations after three years as general superintendent and more than thirty years in the Buick organization, in which he started as a lathe hand. WALTER N. LARKE, formerly superintendent of the engine plant, who was placed on special assignment, now becomes assistant general superintendent. J. G. HAMMOND recently was appointed general superintendent when Mr. Young was made assistant general manufacturing manager.

HARRY M. WHITTAKER became associated on May 1 with the Micromatic Hone Corporation, Detroit, Mich., manufacturer of honing machine tools, in the capacity of chief engineer, and will have complete administration of the

company's engineering design and sales engineering work. He was formerly connected with the Ex-Cell-O Aircraft & Tool Corporation, and until recently, was head of the Whittaker Engineering Co. of Detroit.

BILLINGS & SPENCER Co., Hartford, Conn., announces the appointment of KENNETH B. KOMP, of Detroit, Mich., as the new direct factory representative of the company for the states of Michigan and Ohio. Mr. Komp will devote his entire time to the sale of Billings forged tools, assisting distributors in these two states. The Billings & Spencer Co.'s Detroit warehouse is located at 300 Bates St.

L. B. ALLIASON, for many years prominent in transmission gear manufacturing as engineering representative, has joined the staff of the National Broach & Machine Co., Detroit, Mich., as sales engineer. He has had extensive experience in the tool and gear department of the Ford Motor Co.

WILLIAM BARNES, former assistant master mechanic of the Chrysler Corporation, Jefferson Ave. Plant, has joined the Welker Machinery Co., Inc., 411 New Center Bldg., Detroit, Mich., as sales engineer.

EX-CELL-O AIRCRAFT & TOOL CORPORATION, Detroit, Mich., announces that at a recent meeting of the stockholders, the corporate name was changed to EX-CELL-O CORPORATION.

WILLIAM W. PEATTIE was recently elected president, and REED C. ZENS, secretary and treasurer of the Northern Engineering Works, Detroit, Mich., builders of overhead traveling cranes and hoists.

New England

BALDWIN-DUCKWORTH CHAIN CORPORATION, Springfield, Mass., has recently appointed the OLMSTED-FLINT CORPORATION, Main and Portland Sts., Cambridge, Mass., distributor in metropolitan Boston. TABER & Co., 17 Virginia Ave., Providence, R. I., have been appointed distributors in Rhode Island, superseding Baldwin-Duckworth Chain Sales.

RAYMOND C. BULLARD, at a recent meeting of the stockholders of the Bullard Co., Bridgeport, Conn., was elected a member of the board of directors. Following his graduation from college,



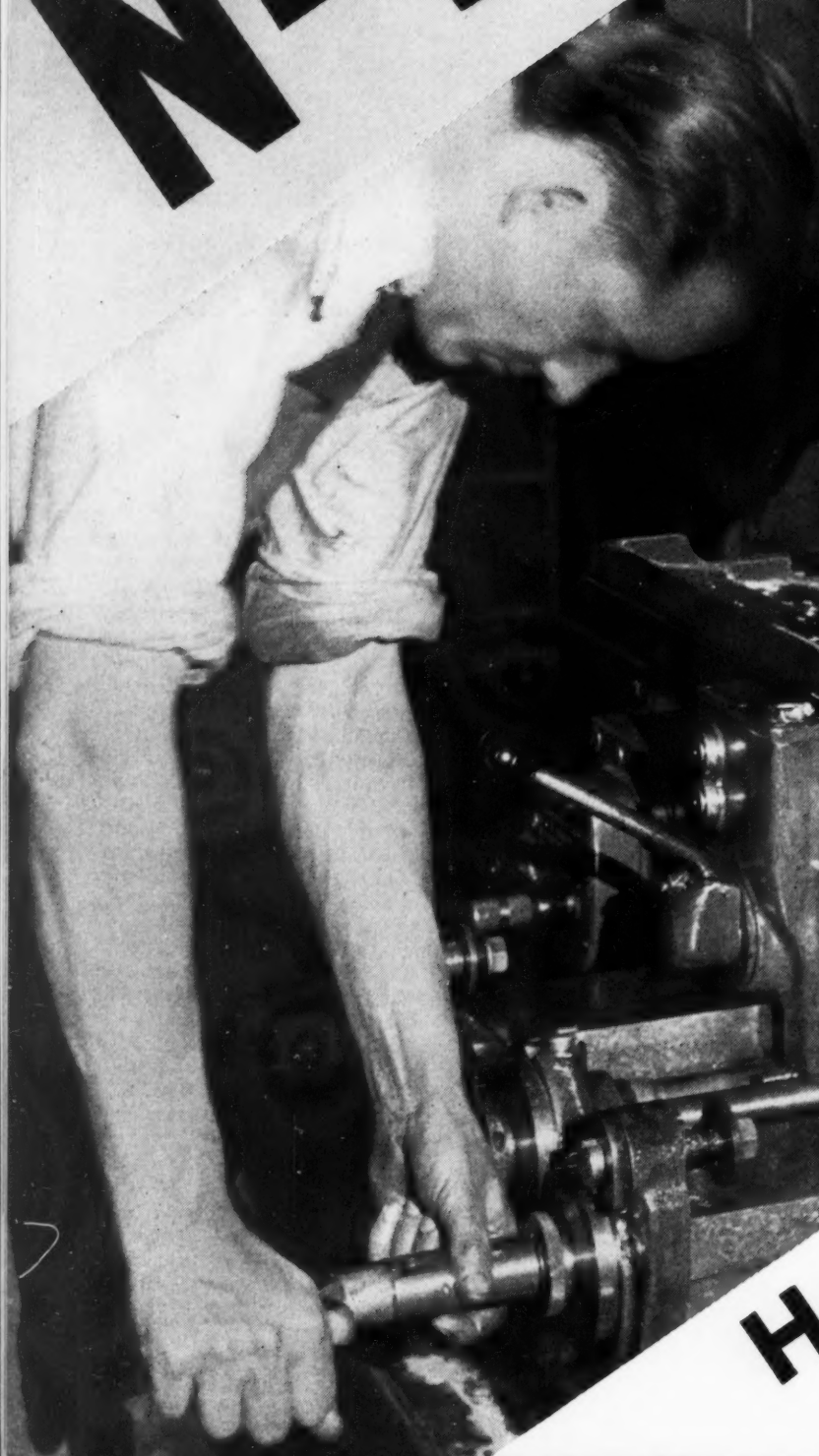
Raymond C. Bullard, New Member of Board of Directors of the Bullard Co.

Mr. Bullard served for six years as an engineering student in the various departments of the manufacturing division of the Bullard Co. He then spent a considerable period of time in the sales engineering department, after which he was placed in the advertising department and appointed advertising manager in 1932, which position he still holds.

PRATT & WHITNEY DIVISION, NILES-BEMENT-POND Co., Hartford, Conn., at a recent meeting of the board of directors, announced the following appointments: EVERETT L. MORGAN has been made secretary and treasurer. Mr. Morgan has been associated with the Niles-Bement-Pond Co. since his graduation from Amherst in 1897. EDWARD S. MOREHOUSE has been made assistant treasurer. Mr. Morehouse became connected with the Niles-Bement-Pond Co. in 1907. FREDERICK N. SCHOFIELD has been made cashier. He joined the Niles-Bement-Pond Co. in 1912 as accountant. RICHARD W. BANFIELD has been made assistant secretary. He is a graduate of the Worcester Academy and Dartmouth College, and became connected with the Pratt & Whitney Co. in 1935. RICHARD F. V. STANTON has been made agency sales manager to fill the vacancy caused by the death of William H. Miller. Mr. Stanton joined the Pratt & Whitney Co. in 1917 as supervisor of gage design.

NORTON Co. has made plans for the construction of a new building, estimated to cost \$300,000, at its plant in Worcester, Mass. The building will be occupied by the grinding wheel finishing departments, and will be ready for use about November 1. It will be 300 feet long and 100 feet wide, and the architectural design will be the Alken transverse monitor type, providing for the admission of light from overhead.

No. 22



Handy to Operate
... Flexibility of Control
heretofore provided in the "Column
and Knee" Design.

B.S.

BROWN &



**"A UNIQUE
"BED-TYPE"**

**Highly Productive
... Rigidity and Production
Advantages of the "Bed-Type"
Milling Machine.**

Ask for details of this
profitable Plain Milling
Machine. Brown &
Sharpe Mfg. Co., Provi-
dence, R. I., U. S. A.

SHARPE

New Jersey

H. O. K. MEISTER has been appointed general manager of the Hyatt Bearings Division of General Motors Corporation, Harrison, N. J., succeeding the late H. J. Forsythe. Mr. Meister has been employed in various capacities in the Hyatt Division since 1914. In 1925, he was made general sales manager, and in 1929, assistant general manager. Previous to becoming connected with the Hyatt Division, Mr. Meister was employed in the shops and engineering departments of the Allis-Chalmers Mfg. Co., Milwaukee, Wis.

New York

WARNER S. HAYS has been appointed managing director of the American Welding Society, 33 W. 39th St., New York City. Mr. Hays brings to the Society an unusual experience in engineering, sales, publishing, membership development, and association management. He is a past-president of the American Trade Association Executives and a former officer of the National Industrial Advertisers.

Mr. Hays is a graduate of Yale Sheffield Scientific School, where he specialized in electrical engineering. Following his graduation, he went to work for the General Electric Co. at Schenectady and Pittsfield, spending several years in the testing and engineering departments and acquiring practical experience in the operation of power stations. Later he became connected with the public utility field, and, following that, with the publishing field. Since the war, he has maintained his own consulting engineering and association executive office, with headquarters in Philadelphia.

J. S. VANICK, of the development and research division of the International Nickel Co., Inc., New York City, spoke before the Philadelphia Chapter of the American Society for Metals, April 30, on "Modern Cast Irons." He presented a brief history of cast iron, and summarized the progress that has been made in the alloying, heat-treatment, and applications of cast iron during the last twenty years. Mr. Vanick also addressed the New Jersey Chapter of the Society in Newark, at its May 14th meeting, on the subject of high-test cast iron alloyed with nickel.

OFFICE MACHINES RESEARCH, INC., 630 Fifth Ave., New York City, has been organized with I. J. BERNI as president, to conduct independent investigations and analyses of office machines, and to report on their technical construction, operative capabilities, and application, thereby serving industrial concerns and other users of office machines.

RICHARD T. ERBAN, consulting engineer, New York City, has been awarded the Edward Longstreth medal by the

Franklin Institute, Philadelphia, Pa., "in consideration of the invention and development of the Transitorq, a practical and useful variable-speed transmission unit."

TRUMAN L. CLAPP and SAUL POLIAK have purchased from Roberts Everett his interest in ROBERTS EVERETT ASSOCIATES, INC. The company, the name of which will be changed to CLAPP & POLIAK, INC., is engaged in exposition management and public relations counsel at 232 Madison Ave., New York City.

FLOYD M. ERLENMEYER has been appointed western New York representative for the Maas & Waldstein Co., Newark, N. J., maker of industrial finishes. Mr. Erlenmeyer will make his headquarters at 253 Alexandria St., Rochester, N. Y.

JOHN W. WHITE was elected vice-president and general manager of the Westinghouse Electric International Co., East Pittsburgh, Pa., at a recent meeting of the board of directors. He will make his headquarters in New York City.

REED-PRENTICE CORPORATION, Worcester, Mass., has appointed the J. L. OSGOOD MACHINERY & TOOL CO., 43 Pearl St., Buffalo, N. Y., exclusive agent in the Buffalo territory for the sale of Reed-Prentice products.

M. H. RHODES, INC., manufacturer of "Mark-Time" devices, has moved the executive and sales departments to larger quarters in the new Pan-American Bldg., 9 Rockefeller Plaza, New York City.

CENTURY ELECTRIC CO. has moved its New York office from 50 Church St. to larger quarters in the Underwood Building, 30 Vesey St.

Ohio

S. D. MAHAN, formerly manager of merchandising advertising, has been appointed general advertising manager of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Mr. Mahan will have general supervision over all advertising and sales promotion work of the Westinghouse Electric & Mfg. Co. and its subsidiary companies. His headquarters will be in Mansfield, Ohio. ROGER BOLIN has been appointed merchandising advertising manager, succeeding Mr. Mahan. Mr. Bolin will also be located in Mansfield.

ROBERT S. HALE, Cincinnati, Ohio, has the distinction of submitting the first paper in the \$200,000 competition of the James F. Lincoln Arc Welding Foundation. Mr. Hale is an architect and structural engineer, and holds the position of construction engineer, Procurement Division, Public Buildings Branch, United States Treasury Department.

W. HERBERT BRETZLAFF has been appointed vice-president of the Defiance Pressed Steel Co., Toledo, Ohio. For the last four years, Mr. Bretzlaff has been vice-president in charge of national account sales for E. A. Laboratories. His new duties will comprise the handling of sales engineering work on all the regular products of the company.

REPUBLIC STEEL CORPORATION, Cleveland, Ohio, has appointed the following distributors of Enduro stainless steel: HUEY & PHILP HARDWARE CO., with warehouses at 1900 Griffin St., Dallas, Tex., and at 2310 Main St., Houston, Tex., and the STAR STEEL SUPPLY CO., 7522 Oakland St., Detroit, Mich.

JOHN WARD BOLTON, of the Lunkensheimer Co., Cincinnati, Ohio, was presented with the John A. Penton medal at the annual dinner of the American Foundrymen's Association in Milwaukee, Wis., Thursday, May 6, for "achievement and service to the foundry industry."

ALLIS-CHALMERS MFG. CO., Milwaukee, Wis., has opened an office at 211 N. Champion St., Youngstown, Ohio. C. H. LEGLER will be in charge of the new office.

Pennsylvania

E. M. LEVINE has been appointed sales engineer in the Pittsburgh district sales office of Cincinnati Milling Machine & Cincinnati Grinders Incorporated, located at 1207 Empire Building. Mr. Levine's territory will cover such cities as Wheeling, Weirton, Stuhenville, Clairton, West Virginia, in addition to the greater portion of Pittsburgh and Allegheny, Pa. Mr. Levine is a graduate of the Washington State University, with the degree B.S. in Mechanical Engineering, and has been with the Cin-



E. M. Levine, Newly Appointed Sales Engineer of Cincinnati Milling Machine & Cincinnati Grinders, Inc.

The Aristocrat of Bearings



*The Aristocrat of Bearings—
from a factory Internationally
Famous for its production of
thoroughbreds*

**H O O V E R
B A L L A N D
B E A R I N G
C O M P A N Y**

A N N A R B O R

M I C H I G A N

cinnati Milling Machine Co. for five years. He is thoroughly experienced on milling and grinding methods.

W. FRANK DETWILER, formerly executive vice-president of the Allegheny Steel Co., Pittsburgh, Pa., has been elected president, succeeding the late Harry E. Sheldon. Mr. Detwiler started with the company in 1909 as a time-card employe on the night shift and rose rapidly to executive status. He became a plant manager in 1918, then general manager, vice-president in 1931, and executive vice-president and a director of the company in 1934. Mr. Detwiler is a director of the American Iron and Steel Institute.

PATTERSON FOUNDRY & MACHINE CO., East Liverpool, Ohio, announces the opening of a Pittsburgh office in the Bessemer Building, with D. M. WILHELM in charge.

Southern States

DR. JAMES T. MACKENZIE, of the American Cast Iron Pipe Co., Birmingham, Ala., was presented with the J. H. Whiting medal at the annual dinner of the American Foundrymen's Association in Milwaukee, Wis., Thursday, May 6, for "achievement and service to the foundry industry."

ALLIS-CHALMERS MFG. CO., Milwaukee, Wis., has opened an office in the National Bank Bldg., Knoxville, Tenn., with W. C. JOHNSON in charge. This office will operate as a branch of the company's Chattanooga district office, of which D. S. KERR is manager.

Washington, D. C.

HERBERT L. WHITEMORE, chief of the engineering mechanics section of the Bureau of Standards, Washington, D. C., has been awarded the Longstreth medal by the Franklin Institute, Philadelphia, Pa., "in consideration of his part in the invention and development of the 'proving ring' for the direct checking of calibrations of testing machines."

CHARLES WILLERS BRIGGS, of the U. S. Naval Research Laboratory, Washington, D. C., was presented with the William H. McFadden medal at the annual dinner of the American Foundrymen's Association in Milwaukee, Wis., Thursday, May 6, for "achievement and service to the foundry industry."

Ryan, Pratt & Whitney Division, Niles-Bement-Pond Co., and C. J. Malone, York Ice Machinery Corporation, vice-chairmen.

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SEPTEMBER 22-24—Fall meeting of the AMERICAN SOCIETY OF MECHANICAL ENGINEERS at the Hotel Lawrence, Erie, Pa. Clarence E. Davies, secretary, 29 W. 39th St., New York City.

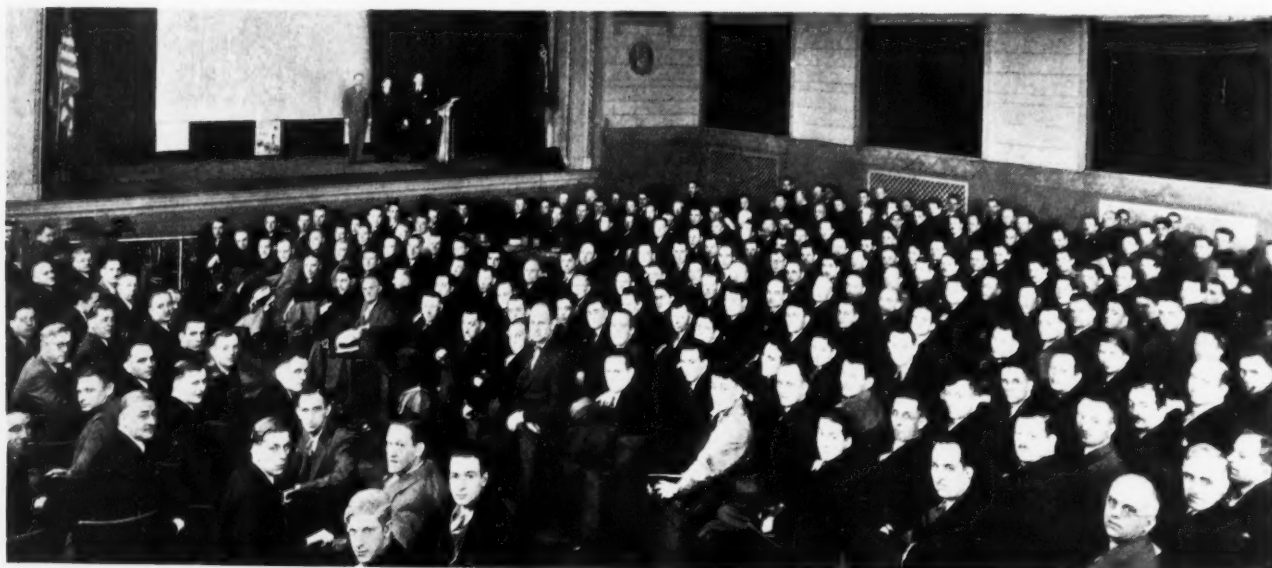
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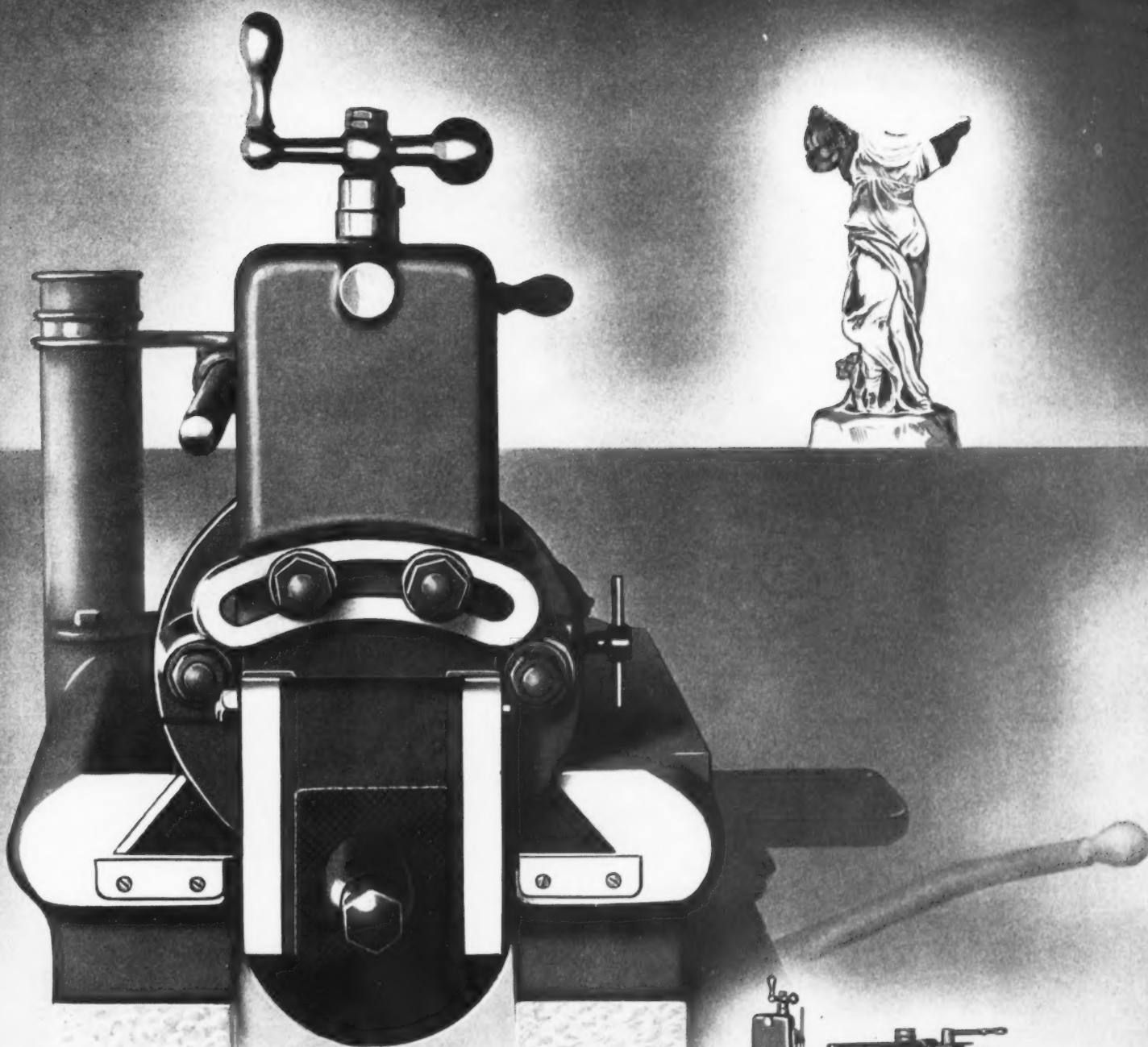
COMING EVENTS

JUNE 18-26—ECONOMICS CONFERENCE FOR ENGINEERS at the Stevens Engineering Camp, Johnsonburg, Warren County, N. J. For further information, address Dr. Harvey N. Davis, president, Stevens Institute of Technology, Hoboken, N. J.

JUNE 20-24—Forty-second annual convention of the NATIONAL ASSOCIATION OF CREDIT MEN at Chicago. H. E. Kay, Industrial Brownhoist Corporation, Bay City, Mich., national chairman. D. A. Robison, Caterpillar Tractor Co., R. H.



Attesting the present great interest in electric welding, nearly 400 men, including architects, machine designers, engineers, and production and maintenance executives, recently attended a five-day course in arc welding design and practice at Pittsburgh, Pa., sponsored by the Lincoln Electric Co., Cleveland, Ohio



Solid Ramways bring rigid cutting ••• long life and accurate performance to Cincinnati Shapers.



THE CINCINNATI SHAPER COMPANY, CINCINNATI, OHIO

SHAPERS • SHEARS • BRAKES

ther information can be obtained from the Executive Offices of the Exposition, Grand Central Palace, New York City.

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OBITUARIES

John Christensen

John Christensen, president of the Cincinnati Gear Co. and former president of the American Gear Manufacturers' Association, died from a heart attack in his cabin aboard the liner *Pilsudski* at its arrival in London on May 11.

Mr. Christensen was born in Denmark sixty-seven years ago. While still a boy, he went to sea; after having spent sev-

eral years on sailing vessels, he arrived in Philadelphia, where he obtained employment in a machine shop. In 1907, he entered into partnership with another young man from Denmark, Soren Sorensen. With their pooled savings, they bought machine shop equipment and started their own business in Cincinnati. This business, now known as the Cincinnati Gear Co., has become an important factor in the gear industry, Mr. Sorensen still being treasurer of the company.

Mr. Christensen was also one of the founders of the American Gear Manufacturers' Association some twenty years ago, and served as president of the Association in 1934.

For nearly twenty years, Mr. Christensen was president of the Danish Brotherhood of America, and ten years ago he was knighted by King Christian of Denmark. Mr. Christensen had planned to attend the coronation ceremonies in England, and then expected to go to Denmark to attend the silver jubilee anniversary of King Christian.

HOMER J. FORSYTHE, general manager of the Hyatt Bearings Division, General Motors Corporation, Harrison, N. J., died on April 29, after an emergency operation performed while he was on a visit to Pinehurst, N. C., with his wife and daughter. Mr. Forsythe was in his fifty-third year. He was born in Wilmington, Del., November 15, 1883. His home was in Montclair, N. J. From an executive position with the E. I. du Pont de Nemours Co. in Wilmington, Mr. Forsythe went to the Hyatt organization in 1921 as assistant general manager, and in 1922 was appointed general manager. He is survived by his widow and his daughter, Mrs. Albert Schomp, Jr.

HARRY A. SMITH, founder and president of the H. A. Smith Machinery Co., Syracuse, N. Y., died in Miami, Fla., on March 10. Mr. Smith was born in St. Lawrence County, N. Y., in 1876. For many years he was manager of the machine tool division of the Syracuse Supply Co. In 1912, he organized his own company for the sale of machine tools. He was known throughout the machine tool industry as one of the oldest established dealers in that part of New York State.

* * *

The exports of industrial machinery from the United States during March, the last month for which complete statistics are available, were valued at nearly \$18,500,000, an increase of 30 per cent over March, 1936, according to the Machinery Division of the Department of Commerce, Washington, D. C. The total exports of power-driven metal-working machinery amounted to \$4,498,000, an increase of 9 per cent over a year ago. Great increases were recorded in turret lathes, vertical boring mills, milling machines, grinding machines, and forging machinery.



John Christensen

NEW BOOKS

COMPENSATING INDUSTRIAL EFFORT. By Z. Clark Dickinson. 479 pages, 6 by 9 inches. Published by the Ronald Press Co., New York City. Price, \$4.50.

This book deals with the problem of work incentives. Its subject matter has been prepared with three important purposes in mind: (1) The improvement of labor management, including the management of executives and salaried specialists, from the standpoint of proficiency in production or other operations; (2) promotion of the well-being of the human factors; and (3) aiding of progress in the scientific and practical fields concerned. The book is divided into three separate parts entitled "Human Nature in Work"; "Wage Elements, Influences, and Administration"; and "Wages and Other Incentives." While the details may vary in different plants, the general principles pertaining to wage incentives are based on the same general foundation.

MANUAL OF LATHE OPERATION AND MACHINISTS' TABLES. 272 pages, 5 1/4 by 8 1/2 inches. Published by the Atlas Press Co., 1819 N. Pitcher St., Kalamazoo, Mich. Price, \$1.

This Manual of Lathe Operation has been prepared to provide authentic and complete operating information for owners of Atlas lathes and other types of metal-cutting lathes. The material should be of value both to the apprentice and to the experienced lathe operator. It covers the following subjects: Care and Construction of Lathes; Theory of Metal Cutting; Cutting Tools; the Machining of Various Materials; Holding the Work; Drilling and Boring; Thread Cutting; Lathe Attachments and their Uses; and Wood Turning on the Metal Lathe.

ELECTRICAL YEAR BOOK (1937). 315 pages, 4 by 6 inches. Published by Emmott & Co., Ltd., 31 King St., W., Manchester 3, England. Price, 1/6.

This is the thirtieth year of publication of a little handbook for electrical engineers, containing a collection of electrical engineering notes, rules, tables, and data. Many parts of the text have been revised to conform to recent developments. The new edition contains the latest rules for cable and conduit capacity, new information on lighting circuits and switching, the most recent statistics relating to traction, and other important electrical data.

INDEX TO A.S.T.M. STANDARDS AND TENTATIVE STANDARDS. 118 pages, 6 by 9 inches. Published by the American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa. Copies furnished without charge.

SHOP EQUIPMENT SECTION

50 Church St., New York City. The cold-forming process is said to produce a fine uniform grain structure and to increase the hardness. This minimizes mushrooming or deformation of the electrodes in use, and consequently gives them increased life.

Electrodes plated with a thin electrically conductive coating of special alloy that is highly resistant to oxidation have also been brought out by this concern. The coating is said to reduce heating of the electrode, softening, and deformation. Standard tapered electrodes of both the cold-formed and plated types are available in all sizes.

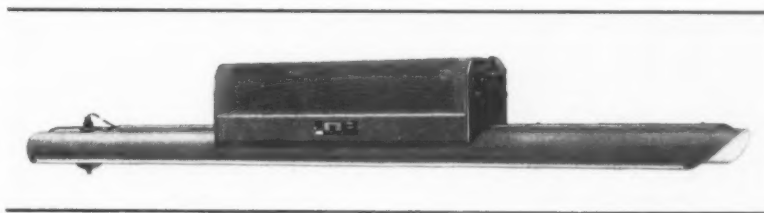
Hoffman "Flexbox" for Heat-Treating Operations

The American Manganese Steel Co., Chicago Heights, Ill., is introducing on the market the Hoffman "Flexbox" here shown, which is intended for use in carburizing, annealing, and other heat-treating processes. This Flexbox is made in six separate parts of heat- and abrasion-resistant Amsco alloy. The corrugated sides are tongued to fit grooves in the corrugated ends and can be keyed in place. The frame thus formed nests in a flanged bottom plate. A flanged cover is provided to fit over the frame. A special type of Flexbox is made for use when contents must be lifted with the box.

It is claimed that this heat-treating box does not distort or crack as the result of alternate heating and cooling, sufficient



Heat-treating Box which Compensates for Expansion and Contraction



Cooper Hewitt Long-tube Mercury Lamp

clearance being provided between the tongues and grooves to absorb the expansion produced by heating and to permit contraction in cooling. The design is such that there is no appreciable gas leakage at the joints.

Cooper Hewitt Improved Long-Tube Mercury Lamps

A series of mercury lamps of the long-tube Cooper Hewitt type having improved lighting efficiency, operating stability, and appearance is being placed on the market by the General Electric Vapor Lamp Co., 893 Adams St., Hoboken, N. J. The new "50-inch light source," having a bare-lamp efficiency of 19.4 lumens per watt, supplies the same output when operating at 350 watts as previous models supplied when operating at 450 watts. The new "33-inch light source" operates at 280 watts with an efficiency of 17.1 lumens per watt, whereas previous models required 350 watts.

The complete lighting units, with enamel reflectors, have an over-all efficiency of about 15 lumens per watt. Both the reflector and the tube are intended for mounting horizontally. Starting and restarting is instantaneous. These units are adapted for use where a minimum of shadow and glare and a maximum of detail-revealing clarity are desirable, as in machining, inspecting, and assembling operations.



Dumore Motor of 1/50 Horsepower Rating

Dumore Fractional-Horsepower Motor

A universal electric motor of 1/50 horsepower, available in several different types, such as ventilated, totally enclosed, sleeve and ball bearing, and with worm-gear speed reduction units, has been added to the line of motors built by the Dumore Co., Racine, Wis.

The standard totally enclosed motor, known as the H type, is rated at 1/50 horsepower when operated at a speed of 6500 revolutions per minute for thirty-minute periods. The standard open motor, known as the HV type, is rated at 1/50 horsepower at 5000 revolutions per minute continuous duty or 1/55 horsepower at 4000 revolutions per minute thirty-minute duty.

Moore Jig Borer with Two-Speed Motor

A jig borer built by the Moore Special Tool Co., Inc., 52 Remer St., Bridgeport, Conn., which has previously been described in the technical press, is now equipped with a motor that can be operated at speeds of 600 and 1200 revolutions per minute. With the five-step V-belt cone drive, this motor provides ten spindle speeds ranging from

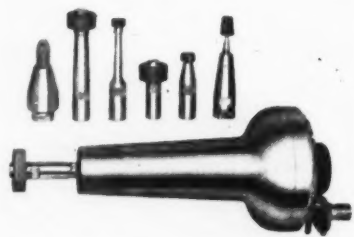


Fig. 1. Onsrud 1/2-horsepower Air Grinder which Develops 38,000 R.P.M.

100 to 2600 revolutions per minute. These speeds permit the drilling of holes 1/32 inch in diameter and even less, and provide for boring holes in mild steel up to 5 inches in diameter, and in tool steel up to 3 inches in diameter.

The starting box is located in the base, and the electrical arrangement is such that it is necessary to push only one button in order to start the motor at either of the two speeds.

Onsrud Air Turbine Grinders

An air turbine grinder designated E-1 which develops 1/2-horsepower and 38,000 revolutions per minute on air pressure of 90 to 100 pounds per square inch has been brought out by the Onsrud Machine Works, Inc., 3940 Palmer St., Chicago, Ill., for grinding forgings, large dies, and similar work. The shape of this tool, as shown in Fig. 1, is such that it fits easily in the operator's hand.

The MD-1 grinder, made by the same company, has been redesigned, as shown in Fig. 2, the shape having been changed to fit the palm of the hand. This tool develops 1/4 horsepower and 50,000 revolutions per minute on air pressure of 90 to 100 pounds per square inch.

An interesting feature of these tools is the lubricating system. The spindle is hollow and is filled with oil, which centrifugal action feeds in a film through resistance elements to

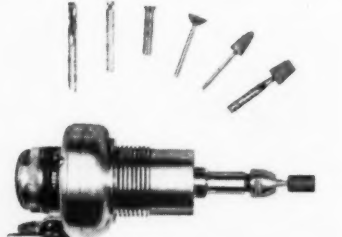


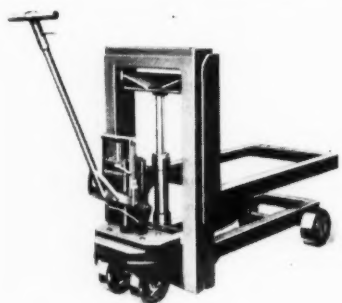
Fig. 2. Onsrud 1/4-horsepower Air Grinder which Develops 50,000 R.P.M.

precision ball bearings, insuring adequate lubrication when the tool is in operation and none when idle.

Lyon Hydraulic Lift-Truck with Elevating Frame

To meet the requirements of a special handling problem where 10 inches elevation is necessary, the Lyon Iron Works, Greene, N. Y., have brought out the lift-truck shown in the accompanying illustration. This truck is an adaptation of the standard hydraulic lift-truck made by the same company which has an elevation of 3 inches. The special feature is the cantilever type elevating frame.

The particular lift-truck shown has a rated capacity of 3500 pounds. The lowered height is 9 inches, and the elevated height 19 inches. The carrying platform is 24 inches wide by 42 inches long.



Lyon Hydraulic Lift-truck with Frame Elevated

Wagner Totally Enclosed Fan-Cooled Motor

A Type CP motor designed for driving equipment that must be operated in atmospheres heavily laden with dust, deteriorating metals and salts, explosive dust, corrosive gases and extreme dampness has been placed on the market by the Wagner Electric Corporation, 6400 Plymouth Ave., St. Louis, Mo.

An external blower on the front end of the motor directs



Wagner Totally Enclosed Fan-cooled Motor

air around the front end-plate, over corrugated surfaces, and through a baffled back end-plate down over the bearing.

Ajax Flexible Coupling of Larger Size

The addition of a Model S-2 to its line of flexible couplings for direct-connected machines has been announced by the Ajax Flexible Coupling Co., 12 English St., Westfield, N. Y. The new coupling can be made with a maximum bore diameter of 2 inches. It has a rating of 12 1/2 horsepower at 100 revolutions per minute, while the torque rating is 660 foot-pounds. The maximum speed is 7500 revolutions per minute, and the overall diameter is 6 1/8 inches. The new model is of the same rubber-cushioned design as other Type S flexible couplings, which are stocked by the concern with bores from 1 1/4 inches upward.

SHOP EQUIPMENT SECTION

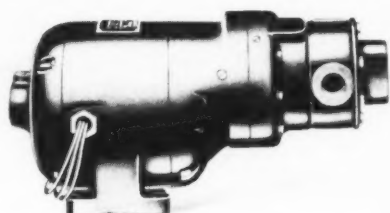


Fig. 1. Brown & Sharpe Geared "Motorpump"

Brown & Sharpe Improved "Motorpumps"

Changes have recently been made in the design and operating characteristics of the Nos. 101, 102, and 103 rotary geared "Motorpumps" made by the Brown & Sharpe Mfg. Co., Providence, R. I. These pumps, one of which is shown in Fig. 1, are now made to run in one direction only, either right-hand or left-hand, as determined by the side of the pump on which the discharge pipe is located, when



Fig. 2. Brown & Sharpe Centrifugal "Motorpump"

viewed from the motor end. A right-hand pump has the discharge pipe on the right-hand side, while a left-hand pump has the discharge on the left-hand side. The direction of discharge is indicated by an arrow on the pump cap. A mechanical seal is now used on these units in place of the packing previously employed.

Motorpumps are now available with three-phase motors both in 220- and 440-volt, 60-cycle types, in addition to the types previously made. Similarly, the No. 204 centrifugal Motorpump, shown in Fig. 2, is now regularly furnished with a three-phase, 50-cycle, 220-volt motor which has a speed of 1425 revolutions per minute.

Seamless Steel "Kantainer"

A one-piece receptacle produced from heavy-gage open-hearth steel through a succession of cold-drawing and annealing operations is being placed on the market by the Seamless Products Co., Inc., 113 W. 42nd St., New York City. This "Kantainer" is made without welds, seams, or rivets, so that its interior does not have any chinks or crevices where rust might start or any seams that might open up and permit leakage.

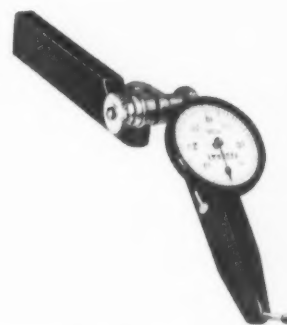
The receptacle is particularly suitable for use in machine shops for collecting metal chips from various machine tools or receiving parts produced on punch presses. Oil or coolant on the chips or work cannot leak to the floor.

Federal Test Indicator

A test indicator graduated to 0.0001 inch, of a light compact design that facilitates sensitivity when used on light supporting members, is a recent addition to the line of precision measuring instruments manufactured by the Federal Products Corporation, 1144 Eddy St.,

Providence, R. I. This indicator is shown in the illustration equipped with a swivel contact point and a universal holding bar, which provide for any desired settings.

The movement consists of a combination lever and a direct-contact crown gear, this construction reducing friction and wear to a minimum. The motion of the point can be reversed by



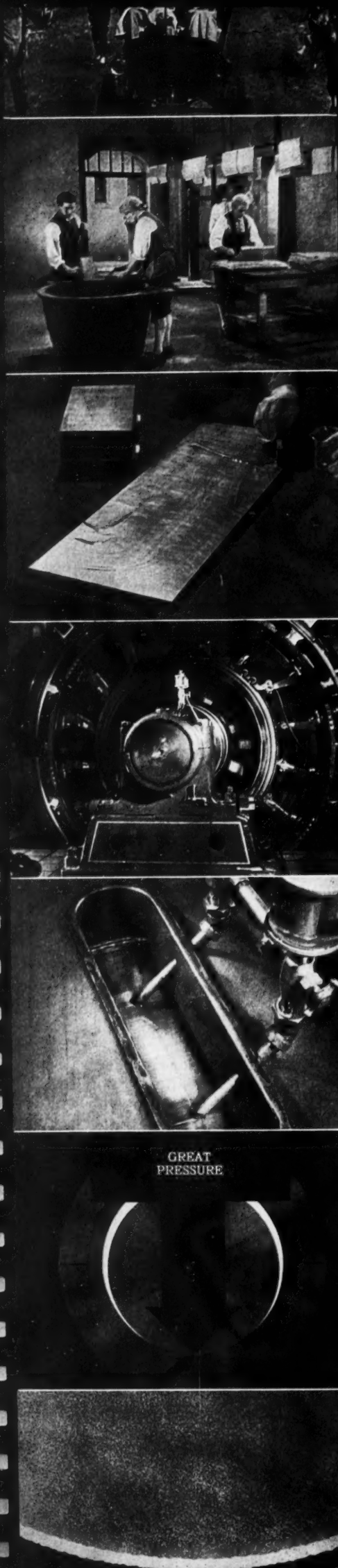
Test Indicator with Swivel Contact Point and Universal Bar

merely shifting a lever. The indicator has a range of 0.008 inch. The rotating dial has an outside diameter of only 1 1/8 inches.

* * *

Milwaukee Section of Welding Society Elects New Officers

K. L. Hansen, a prominent authority on electric arc welding, associated with the Harnischfeger Corporation of Milwaukee, Wis., was elected chairman of the Milwaukee section of the American Welding Society at a meeting held on May 27. Mr. Hansen is widely known to men in the electrical world, and has been very active for many years in connection with the American Society of Electrical Engineers, as well as the American Welding Society. Harold Falk, of the Falk Corporation, was elected vice-chairman. J. J. Chyle, of the A. O. Smith Corporation, was elected secretary and treasurer.



Lubrication Principles Emphasized by Socony-Vacuum Motion Picture

A motion picture that portrays the growth of industry as having been dependent to a considerable extent upon the simultaneous development of lubricating oils to meet the requirements of heavier and speedier machinery has recently been filmed by the Socony-Vacuum Oil Co., Inc., New York City. This film depicts the slow hand-production methods of bygone years in the textile, railway, and other industries, and compares them with the speedy methods of today.

Why machines need lubrication and the factors to be considered in the proper selection of lubricating oils are brought out in a way that even the layman can readily follow. Photomicrographs enlarged to cover the entire screen show the reasons for friction, and animated drawings illustrate the manner in which lubricant provides protection to metallic surfaces. In addition to the lubrication of bearings and cylinders, considerable attention is given to gearing. The illustration at the left shows typical views selected from various sections of the film to indicate its scope.

This motion picture will be used in various ways to bring the important facts of lubrication before the men in industry who influence the purchase of lubricants. It will be shown to business organizations and factory executives throughout the country, copies of the film having been supplied to various Socony-Vacuum divisional offices.

* * *

Further Information on Lincoln Arc-Welding Competition

Dr. E. E. Dreese, chairman of the Board of Trustees and of the Jury of Awards of the James F. Lincoln Arc Welding Foundation, Cleveland, Ohio, has issued a statement to further clarify the object of the Foundation's fifty-four awards, totaling \$25,300, for functional machinery papers in its \$200,000 series of awards. Dr. Dreese states that the idea has been expressed in letters and reports from the machinery field that the opportunities of the Lincoln Foundation's functional machinery awards are available only to individuals familiar with electric welding and its use. This idea is an erroneous one, for although a definite object of the awards is to urge engineers, designers, and production managers to study machines that are now partially welded, so that electric welding can be applied more extensively, the primary object of the fund is to encourage the study of machines built by some other method, so that electric welding can be used in construction. The machines described need not be built entirely by arc welding. Further information regarding any phase of the competition can be obtained from the secretary of the James F. Lincoln Arc Welding Foundation, P. O. Box 5728, Cleveland, Ohio.

NEWS OF THE INDUSTRY

Canada

WILLIAMS & WILSON, LTD., 544 Inspector St., Montreal, Canada, has been appointed representative of the complete line of cutting tools, grinding spindles, drill jig bushings, precision boring machines, precision thread grinders, carbide tool grinders, hydraulic power units, special designed multiple equipment, and precision parts made by the Ex-Cell-O Corporation, Detroit, Mich.

N. A. STRAND & Co., N. Wolcott Ave., Chicago, Ill., manufacturers of flexible shafts and machines, have recently made exclusive agency arrangements in Canada with WILLIAMS & WILSON, LTD., covering the provinces of Quebec, Ontario, and the Maritime Provinces.

Illinois

AMERICAN STEEL & WIRE Co., 208 S. LaSalle St., Chicago, Ill., has created a central metallurgical department designed to coordinate and assist the district metallurgical departments. The new department is headed by J. S. RICHARDS, formerly director of manufacturing practices. The other members of the new division are C. W. MEYERS, assistant manager, and the following division metallurgists: W. F. CONLIN, J. R. THOMPSON, A. E. HIBSCHMAN, C. A. SCHACHA, and E. F. OVIATT.

EDWARD W. RISTAU has been elected vice-president of Skilsaw, Inc., 3345 Elston Ave., Chicago, Ill., manufacturer of electric hand saws, grinders, polishers, etc. Mr. Ristau will continue his work of the last five years in directing sales, advertising, and promotion.

NEW BRITAIN-GRIDLEY MACHINE DIVISION OF THE NEW BRITAIN MACHINE Co., New Britain, Conn., builder of multiple-spindle screw and chucking machines, has appointed J. J. BARRY, of Chicago, western representative.

H. B. SPACKMAN has been appointed general sales manager of LYON METAL PRODUCTS, INC., Aurora, Ill. Mr. Spackman was formerly general sales manager of the Steel Products Division of the U. S. Gypsum Co., Chicago, Ill.

Michigan

FEDERAL PRODUCTS CORPORATION, 1144 Eddy St., Providence, R. I., manufacturer of precision measuring instruments, announces that the Detroit office

of the concern has been moved to larger quarters in the Stormfeltz-Loveley Building, 7310 Woodward Ave., Detroit, Mich. A complete stock of Federal dial indicator parts, as well as a staff of repair men, is maintained at this office. HENRY I. BOUCHARD has been added to the staff of the Detroit office.

JOSEPH MONAHAN, machine tool dealer, announces the removal of his office from 321 Lake Michigan Drive to 351 Indiana Ave., N.W., Grand Rapids, Mich.

New England

FREDERICK E. BARTH, for eleven years vice-president of the Graton & Knight Co., Worcester, Mass., was elected president at a recent meeting of the directors to succeed the late Frank H. Willard. Mr. Barth has been with the company since 1919, serving first as office manager and then as general sales manager; in 1926, he was elected vice-president and assistant general manager.

BILLINGS & SPENCER Co., Hartford, Conn., held a three-day conference of the sales organization June 7 to 9, which was attended by sales engineers and representatives of the company from the states of Texas, Virginia, Michigan, Illinois, Pennsylvania, New York, and New Jersey. A journey was taken through the plant under the guidance of James Allison, factory manager, and the conference was addressed by W. A. Purtell, president of the company, W. Roy Moore and H. E. Oberg, vice-presidents, James Allison, and R. H. Young, advertising manager.

F. O. HOAGLAND, master mechanic, Pratt & Whitney Division of Niles-Bement-Pond Co., Hartford, Conn., has been nominated for vice-president of the American Society of Mechanical Engineers to serve for one year beginning with the annual meeting, December, this year.

F. W. MCINTYRE, JR., has joined the sales organization of the Reed-Prentice Corporation, Worcester, Mass. He will be located in the New England territory, with headquarters at Worcester.

New Jersey

HARRY M. CARROLL, advertising manager, Hyatt Bearings Division, General Motors Corporation, P. O. Box 476, Newark, N. J., was elected president of the Industrial Marketers of New Jersey Chapter of the National Industrial Advertisers Association at a recent meeting of the chapter.

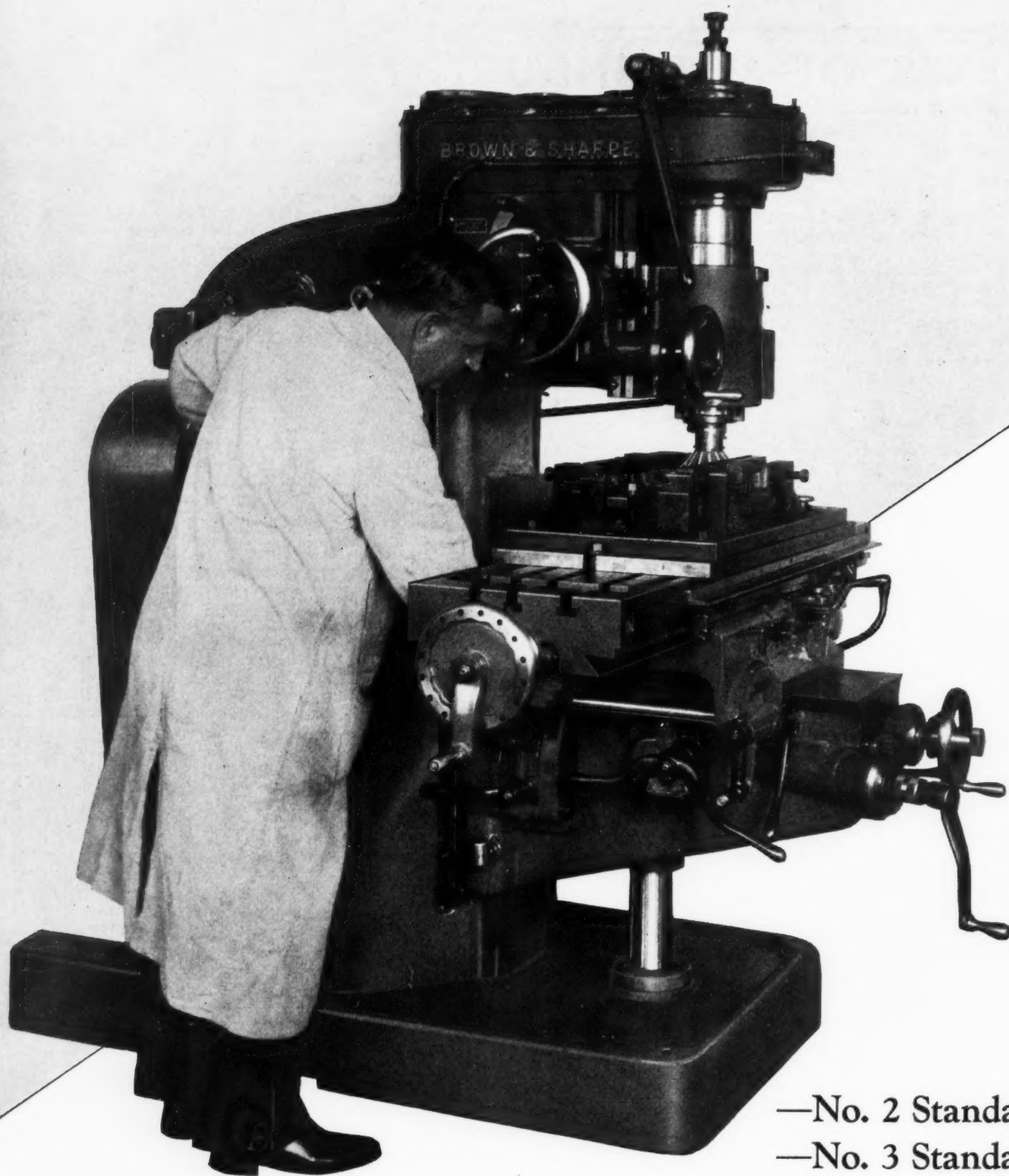
H. N. DAVIS, president of Stevens Institute of Technology, Hoboken, N. J., has been nominated for president of the American Society of Mechanical Engineers for the year 1938.

J. J. SUMMERSBY, assistant vice-president of the Worthington Pump & Machinery Corporation, Harrison, N. J., has been appointed general sales manager.

GENERAL MOTORS CORPORATION, on May 27, dedicated its new assembly plant at Linden, N. J., which affords facilities for the annual output of approximately 120,000 automobiles. Buick, Oldsmobile and Pontiac cars are being assembled here for eastern markets. This plant marks another step in the furtherance of the General Motors policy of industrial decentralization. About 2000 workers will be employed when the plant operates at full capacity. W. S. ROBERTS,



Group of Sales Engineers and Representatives who Attended the Billings & Spencer Sales Conference



- No. 2 Standard
- No. 3 Standard
- No. 2 High Speed

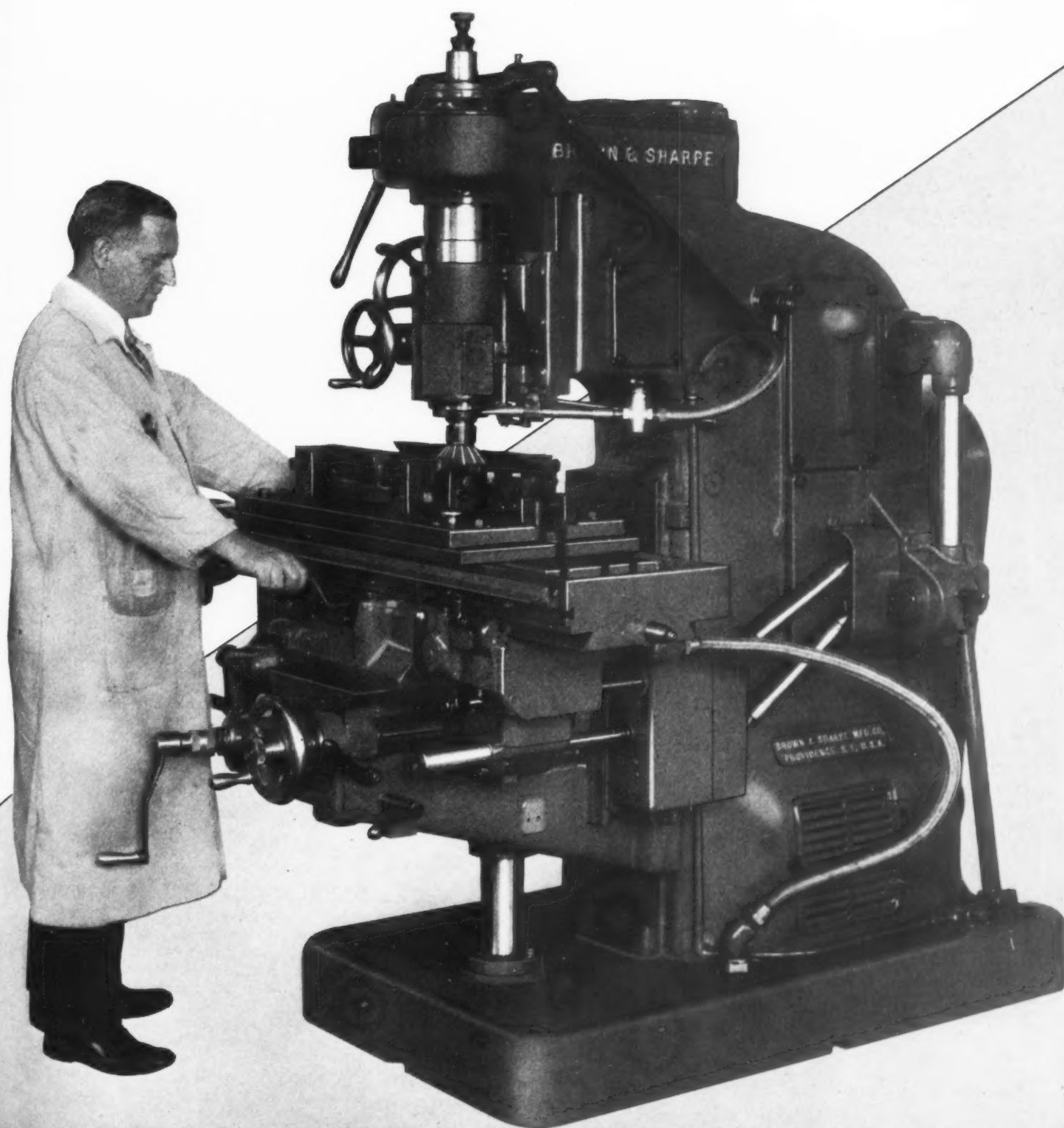
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Modern Design—with many desirable features for handiness and accuracy. Details on request. Brown & Sharpe Mfg. Co., Providence, R.I., U.S.A.

BROWN &

PRODUCTIVE and ECONOMICAL **VERTICALS—**



SHARPE



**W. S. Roberts, General
Manager of New General
Motors Plant at Linden**

who is general manager of the plant, has been with the General Motors Corporation since 1922, during which period he has operated plants in various cities of the United States and also at Sao Paulo, Brazil.

New York

DR. LEON PRATT ALFORD, formerly editor of the *American Machinist*, *Industrial Management*, and *Manufacturing Industrial Management*, has been appointed professor of administrative engineering and chairman of the department of industrial engineering of New York University, succeeding Professor JOSEPH WICKHAM ROE, who is retiring as professor-emeritus after sixteen years of teaching and administrative service.

Dr. Alford is equally well known as an engineer and as an editor of technical magazines. He holds the Admiral Melville gold medal for contributions to the literature of mechanical engineering, and the Gantt Memorial gold medal for distinguished achievement in industrial management. Since 1935, Dr. Alford has been associated with the Federal Communications Commission as assistant engineer-in-charge of the manufacturing costs unit. He is a fellow and past-president of the Institute of Management, a fellow and past vice-president of the American Society of Mechanical Engineers, a past vice-president of the American Engineering Council, and a past vice-president of the Management Council.

GIEBEL MACHINE TOOL CO., INC., 236 W. 55th St., New York City, has been appointed exclusive representative in the New York territory by BRYANT MACHINERY & ENGINEERING Co., Chicago,

Ill., general distributor of the following lines: Cleerehan drilling machines; Dreses radial drills, monitor lathes, and horizontal machines; Ohio Machine Tool Co.'s shapers, planers, and horizontal boring, drilling and milling machines; and Kling heavy-duty grinders.

CONSOLIDATED MACHINE TOOL CORPORATION, Rochester, N. Y., manufacturer of heavy machine tools, has recently opened an office in the Hudson Terminal Building, 50 Church St., New York City. ALBERT MEYERS has been appointed representative to handle sales and service in the New York territory. The company also announces the opening of an office at 105 Los Angeles Ave., Fox Chase, Philadelphia, Pa., with ROBERT L. ARMS as representative. Mr. ARMS has had many years of experience in this territory.

W. A. JONES FOUNDRY & MACHINE CO., 4405 W. Roosevelt Road, Chicago, Ill., manufacturer of speed reducers, gears, and transmission appliances, announces that the Buffalo, N. Y., office, in charge of FRANK W. STUKER, is now located at 361 Delaware Ave., in the Curtiss Building.

AJAX FLEXIBLE COUPLING CO., 12 English St., Westfield, N. Y., announces the opening of three new sales offices, in Akron, Kansas City, and Seattle. BEESE & TERRY will be the representatives in Akron, ARTHUR D. SCHWARTZ will cover the Kansas City territory, and W. F. NICHOLS will serve the area around Seattle.

A. P. RICHARDSON, formerly secretary of the American Institute of Accountants, is president of Office Machines Research, Inc., 630 Fifth Ave., New York City. Through an error it was announced in JUNE MACHINERY that I. J. Berni was president. Mr. Berni is a member of the advisory board.

CARL BAUSCH, vice-president of the Bausch & Lomb Optical Co., Rochester, N. Y., has been nominated for a manager of the American Society of Mechanical Engineers to serve for three years beginning with the annual meeting this coming December.

HARTE COOKE, mechanical engineer, McIntosh & Seymour Corporation, Auburn, N. Y., has been nominated for vice-president of the American Society of Mechanical Engineers to serve for two years beginning with the annual meeting, December, this year.

FEDERAL PRODUCTS CORPORATION, 1144 Eddy St., Providence, R. I., announces that its New England agent, R. T. PALMER, has opened an office in Rochester, N. Y., 241 Powers Bldg., with ROBERT B. HAWKINS in charge.

IDEAL COMMUTATOR DRESSER Co., 1011 Park Ave., Sycamore, Ill., has removed its New York office to larger quarters at 61 E. 11th St.

Ohio

J. F. LINCOLN, in whose honor was created the James F. Lincoln Arc Welding Foundation, sponsor of the \$200,000 Arc Welding Award Program, is in England giving a series of talks at the invitation of various engineering societies and institutes. Mr. Lincoln's invitations to speak in England were prompted by growing interest on the part of British firms and societies in the application of electric welding in manufacture. Mr. Lincoln is director of the Lincoln Electric Co., Ltd., London, England, affiliate of the Lincoln Electric Co., Cleveland, Ohio, of which he is president.

EASTERN MACHINERY Co., formerly located at 3267 Spring Grove Ave., Cincinnati, Ohio, has moved to the plant previously occupied by the American Blower Co. at Tennessee Ave. and Pad-dock Road, Cincinnati, where the company will have available a plant having a floor area of 80,000 square feet equipped with two 30-ton cranes and eight smaller cranes, and served by the Baltimore & Ohio and the Norfolk & Western railroads. New equipment is being installed to handle the company's work of rebuilding machine tools.

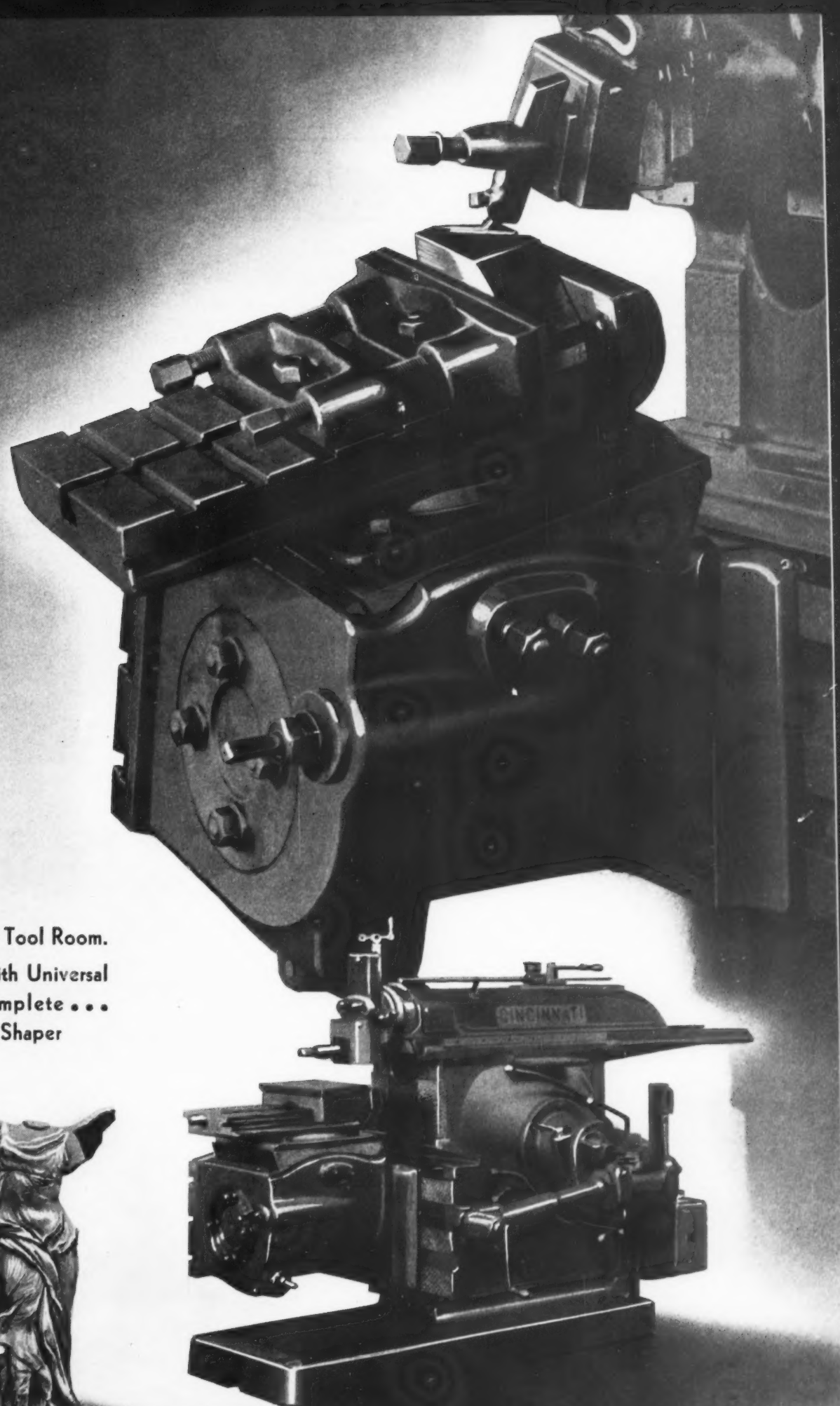
FRED L. PLUMMER, consulting engineer and associate professor of structural engineering at the Case School of Applied Science, Cleveland, Ohio, has been elected president of the Cleveland Engineering Society. WARD HARRISON, director of engineering of the General Electric Co., was elected vice-president.

FREDERICK G. BANNING, formerly with the scientific apparatus department of Cornell University Medical College, has become associated with Designers for Industry, Inc., Cleveland, Ohio, industrial designers and product stylists, as chief engineer in charge of engineering development.

DR. JOHN S. PLASKETT, until recently head of the Dominion Astrophysical Laboratory at Victoria, B. C., Canada, has been appointed scientific consultant on telescope design of the Warner & Swasey Co., Cleveland, Ohio.

Pennsylvania and Maryland

E. F. HOUGHTON & Co., 240 W. Somerset St., Philadelphia, Pa., has organized a Research Sales Staff for the purpose of rendering impartial and expert service to its customers and to industry as a whole. The staff is made up of the following divisions (with specialists in each particular field): Textile research, with H. C. ROBERTS as manager; lubrication research, C. P. GEEN, manager; metal-working research, G. W. ESAU, manager; and leather research, J. N. SMITH, manager. The managers of each division will work to develop new products and to better existing products when possible.



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The Cincinnati with Universal
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Tool Room Shaper



THE CINCINNATI SHAPER COMPANY, CINCINNATI, OHIO
SHAPERS • SHEARS • BRAKES

FIRTH-STERLING STEEL CO., McKeesport, Pa., entertained members of the American Society of Tool Engineers at a dinner held Friday, June 11, at the Penn-McKee Hotel. The speaker was Malcolm F. Judkins, of the Firth-Sterling Steel Co., whose subject was "A Description of Production Processes in the Making of Firthite Sintered Carbide Tools." Following the dinner, the members inspected the company's new Firthite-Firthaloy plant.

E. B. EVLETH has been appointed vice-president and general manager of the Brown Instrument Co., Division of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa., manufacturer of industrial recording and control instruments. Mr. Evleth succeeds WILLIAM J. HAJEK who has retired on account of ill health. C. L. SAUNDERS will take Mr. Evleth's former position of resident vice-president at Chicago, in charge of the Midwest region.

S. DUNCAN BLACK, president of the Black & Decker Mfg. Co., Towson, Md., sailed for Europe on May 26 on the *Queen Mary* to visit the European distributors and agents of the company. While abroad, Mr. Black will make his headquarters at the company's plant at Slough, Bucks, England. He also plans to visit the Paris International Exposition where Black & Decker portable electric tools are on display.

ALONZO G. DECKER, vice-president and general manager of the company, sailed for Europe on June 23 to visit the Slough plant in England, and make a general survey of the company's operations abroad.

Wisconsin

L. T. MCGUIRE, for eighteen years assistant sales manager with the Byers Machinery Co., Ravina, Ohio, has recently entered the employ of the Harnischfeger Corporation, Milwaukee, Wis., as divisional manager of the large excavator division.

C. C. JORDAN, sales engineer for the last ten years in the steam turbine division of the Allis-Chalmers Mfg. Co., Milwaukee, Wis., has been appointed assistant manager of that division.

CUTLER-HAMMER, INC., Milwaukee, Wis., manufacturer of electric control apparatus, has opened a new sales office in Dallas, Tex., at 624 Santa Fé Building.

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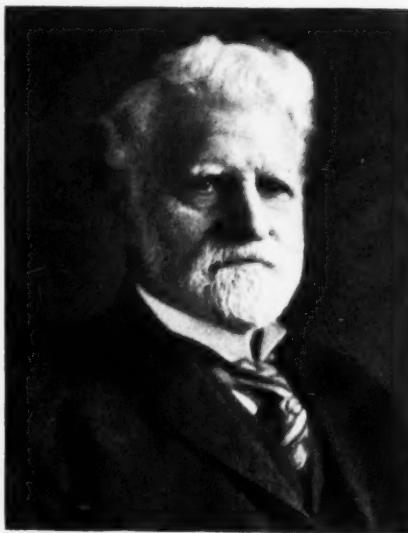
AUGUSTIN ROUSSEAU-MAILLARD, director general of *La Machine Moderne*, was decorated with the Order of the Legion of Honor at a luncheon in Paris on May 26, attended by many of the leading French machine tool manufacturers and merchants. M. Luc, director general of technical education, presided at the luncheon.

OBITUARIES

Ambrose Swasey

Ambrose Swasey, one of the founders of the Warner & Swasey Co., Cleveland, Ohio, and a nationally and internationally known figure in the engineering world, died on June 15 at his summer home in Exeter, N. H., aged ninety years.

Mr. Swasey was born in Exeter on December 19, 1846. When he was eighteen years old he began an apprenticeship with the Exeter Machine Works. There he met as a fellow ap-



Ambrose Swasey

prentice Worcester R. Warner, who later became his business associate and lifelong friend. In 1870 both men entered the employ of the Pratt & Whitney Co., Hartford, Conn. There Mr. Swasey's rare ability won him command of the gear-cutting department. In this capacity, he developed an epicycloidal milling machine which turned out gear teeth more accurate than any of that time.

In 1880, Mr. Swasey left the Pratt & Whitney Co. and joined with Mr. Warner in the establishment of a business under the firm name of Warner & Swasey. Foreseeing the growth of industry in the west, the business was first located in Chicago, but as at that time, workmen of the class required for precision manufacture were not available in that city, the firm moved to Cleveland in 1881. The first shop was built on a part of the site still occupied by the present Warner & Swasey plant.

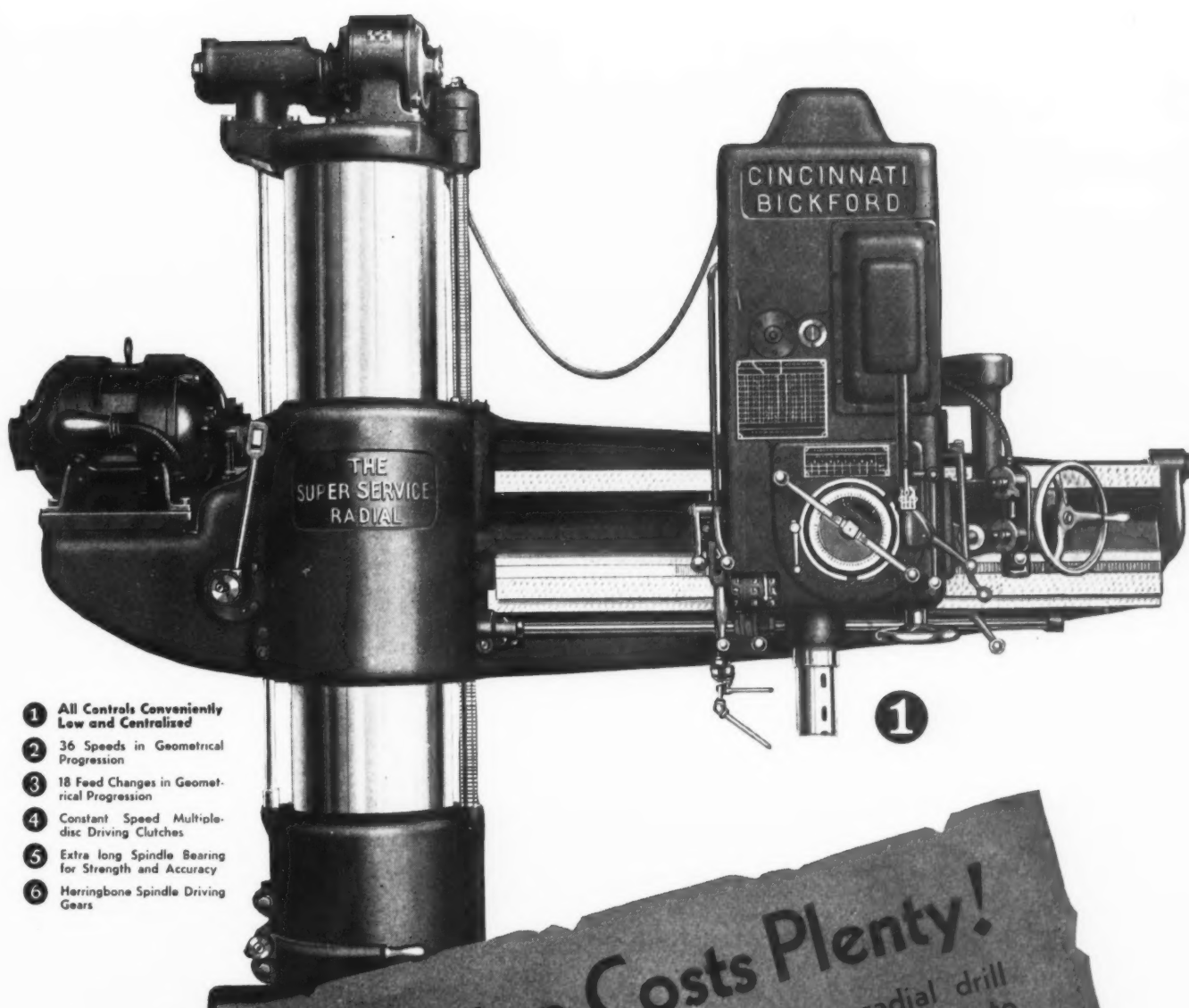
In addition to building the well-known line of Warner & Swasey machine tools, the company engaged in the building of telescopes, and some of the

largest and best-known telescopes in the world have been constructed in the Warner & Swasey shops. The most recent and outstanding product was the 82-inch reflector now being erected for the McDonald Observatory. In addition, transits, meridian circles, and astronomical and other instruments were developed and built at the plant. One outgrowth of this astronomical work was the famous dividing engine perfected at the Warner & Swasey plant in response to the U. S. Government's need for a meridian circle to be used in the Naval Observatory at Washington. Mr. Swasey perfected this mechanism, which is the most accurate engine for the dividing of the circles ever produced, the greatest error of which is less than one second of arc. The secret of this lay in the extreme accuracy of the tools and instruments used, which has been the basis for the company's high standing as a builder of turret lathes.

In all of the Warner & Swasey achievements, Mr. Swasey has had his part in supplying inspiring leadership. Throughout his career, he has been quick to apply the facts of science to the betterment of practice in the arts. Having strong convictions as to the value of scientific research, he proposed that a movement in the interest of research be organized by and for the great national engineering societies, and his proposals led to the establishment of the Engineering Foundation in 1914, to which he has contributed a total of \$750,000. This Foundation, administered by the country's four leading professional engineering societies, the American Society of Mechanical Engineers, the American Society of Civil Engineers, the Institute of Mining and Metallurgical Engineers, and the American Institute of Electrical Engineers, was created "for the furtherance of research, science, and engineering, or for the advancement in any other manner of the profession of engineering and good of mankind." His other benefactions, within and without the engineering field, are too widespread to be enumerated.

Mr. Swasey gave generously of his time in the development of professional and scientific undertakings. He received all the major honors within the power of his fellow engineers to bestow. He was one of the founders of the American Society of Mechanical Engineers, and was a past-president and honorary member of that Society. He was also a past-president and honorary member of the Cleveland Engineering Society, an honorary member of the American Society of Civil Engineers, a member of the National Research Council, and a member of the American Philosophical Society. He received many honorary degrees from different universities, among which were Doctor of Engineering, Doctor of Science, and Doctor of Laws. He was one of 250 members of the National Academy of Sciences.

In 1901, he received from the French Government the decoration of Chevalier of the Legion of Honor, and in 1921 he



- ① All Controls Conveniently Low and Centralised
- ② 36 Speeds in Geometrical Progression
- ③ 18 Feed Changes in Geometrical Progression
- ④ Constant Speed Multiple-disc Driving Clutches
- ⑤ Extra long Spindle Bearing for Strength and Accuracy
- ⑥ Herringbone Spindle Driving Gears

Waste Motion Costs Plenty!

WALKING continuously from one end of a radial drill to the other is exorbitant waste. It can amount to as much as 80% of the total time! This waste is eliminated on the Super-Service Radial. Here all controls are centralized at the point of operation. All spindle speeds—36 selective sliding gear changes—rapid power-traverse—easy swinging arm—power column clamping—power arm traverse—electric arm clamping—all these controls are low at the head. No waste time! No waste motion! No expensive idling on the Super-Service Radial! Write for Bulletin R-24 and see for yourself.

THE CINCINNATI BICKFORD TOOL CO.
OAKLEY, CINCINNATI, OHIO, U. S. A.



was made Officer of the Legion of Honor. He was an honorary member of the British Institution of Mechanical Engineers, the British Institution of Mining Engineers, and the Society of Civil Engineers of France, a member of the British Astronomical Association and a Fellow of the Royal Astronomical Society.

He received many medals in recognition of his outstanding achievements in the engineering field, the most recent of which was the Hoover Gold Medal awarded last December by the four leading engineering societies in America. Among the other medals awarded him may be mentioned the John Fritz Gold Medal, the Franklin Gold Medal, the Medal of the American Society of Mechanical Engineers, and the Washington Award.

Mr. Swasey was not only one of the best-known men in the engineering field, but one of the most beloved leaders. His charming personality won him an unusually wide circle of friends. For a number of years, as each birthday came around, Mr. Swasey was literally deluged with telegrams and letters of congratulation from his many admirers. His loss will be keenly felt by all those who had the privilege of knowing him.

William S. Davenport

William Simeon Davenport, president and general manager of the Davenport Machine Tool Co., Inc., Rochester, N. Y., died in that city on June 7, aged seventy-six years. Mr. Davenport was born on March 14, 1861, at Williamstown, Vt. He was educated in the public schools of Williamstown and at an early age entered upon his business career in a button factory in Rutland. Then for a period of six years he worked for the Fairbanks Scale Co. at St. Johnsbury, Vt., first in the tool-room and later as a scale-maker. Shortly afterward, he



William S. Davenport

entered the employ of the Brown & Sharpe Mfg. Co., Providence, R. I., as general machinist, later becoming designer of automatic screw machines.

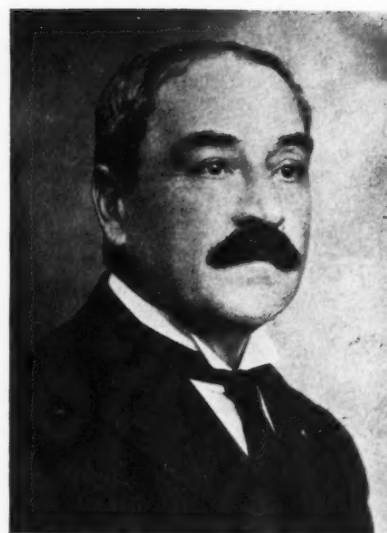
After twelve years association with Brown & Sharpe, he went into business for himself designing special machines for manufacturing in clock shops which were built at the works of the Morse Twist Drill & Machine Co. at New Bedford, Mass., and he was prominently identified with this industry for nearly twenty years. During this period he also operated a shop in Springfield, Mass., where he built the first multiple-spindle automatic screw machine that formed the basis of his present business. In 1919, he moved to Rochester, N. Y., where he organized the Davenport Machine Tool Co. of which he became president, and after the first year, also general manager.

Frank H. Willard

Frank H. Willard, president and general manager of the Graton & Knight Co., Worcester, Mass., died suddenly on May 25, at the Hahnemann Hospital, of a heart attack, following an operation. Mr. Willard was born in Harvard, Mass., December 9, 1865. On January 26, 1883, when he was seventeen years old, he started as errand boy with the Graton & Knight Co., then located at Front and Trumbull Sts., and employing only thirty-eight men. From errand boy he became a leather cutter, and at the end of ten years, rose to the position of foreman. In 1898, he became superintendent of the belt shop, and in 1901, general superintendent. Twelve years later he became assistant general manager of the company, and in 1917, was made vice-president and general manager. At that time, the company employed 3300 men. When the company was reorganized in 1926, he was elected president.

Mr. Willard was a trustee for many years of the Worcester Independent Industrial Schools and the Worcester Boys Trade School. He was actively identified with the industry with which he was connected, having been first president of the American Leather Belting Association, president of the Power Transmission Association, of the Manufacturers Research Association, and of the Associated Industries of Massachusetts, as well as vice-president of the National Association of Manufacturers.

RUSSELL T. GRAY, industrial advertising executive, died May 26 at the St. Francis Hospital in Evanston, Ill., at the age of forty-four years. Mr. Gray was born at Indianapolis, Ind. He graduated from Purdue University in 1915, and in 1917 became associated with the Shuman Advertising Co. of Chicago, later resigning to form the firm bearing his own name. He was a founder of the Engineering Advertisers' Association of Chicago and was a member of the Federated Advertising Club.



Charles A. Strelinger

Charles A. Strelinger

Charles A. Strelinger, one of the pioneers of the machinery, tool, and supply business, and president and founder of the Charles A. Strelinger Co. of Detroit, Mich., died on June 16 at his home in St. Louis, Mo., aged eighty-one years. Mr. Strelinger was born in Detroit on May 4, 1856, of Austrian parentage. He was educated in the public schools of Detroit and began his active business career in the employ of Glover & Powell, hardware merchants, in 1870. Five years later, the T. B. Rayl Co. bought out the Glover concern, and he remained with the new concern for nearly ten years.

In 1884 he and Captain Gilbert Hart, who was reputed to be the original sili-cate grinding wheel man in this country, organized the Charles A. Strelinger Co., which was incorporated in 1897. The concern started in business with hardware and tool lines, but gradually added more supplies and machinery.

Mr. Strelinger brought out what was perhaps the first mill supply catalogue in this country entitled "A Book of Tools." This book was used as a textbook in a number of colleges throughout the country. Although it has been out of print for over thirty-five years, the company still has frequent requests for it.

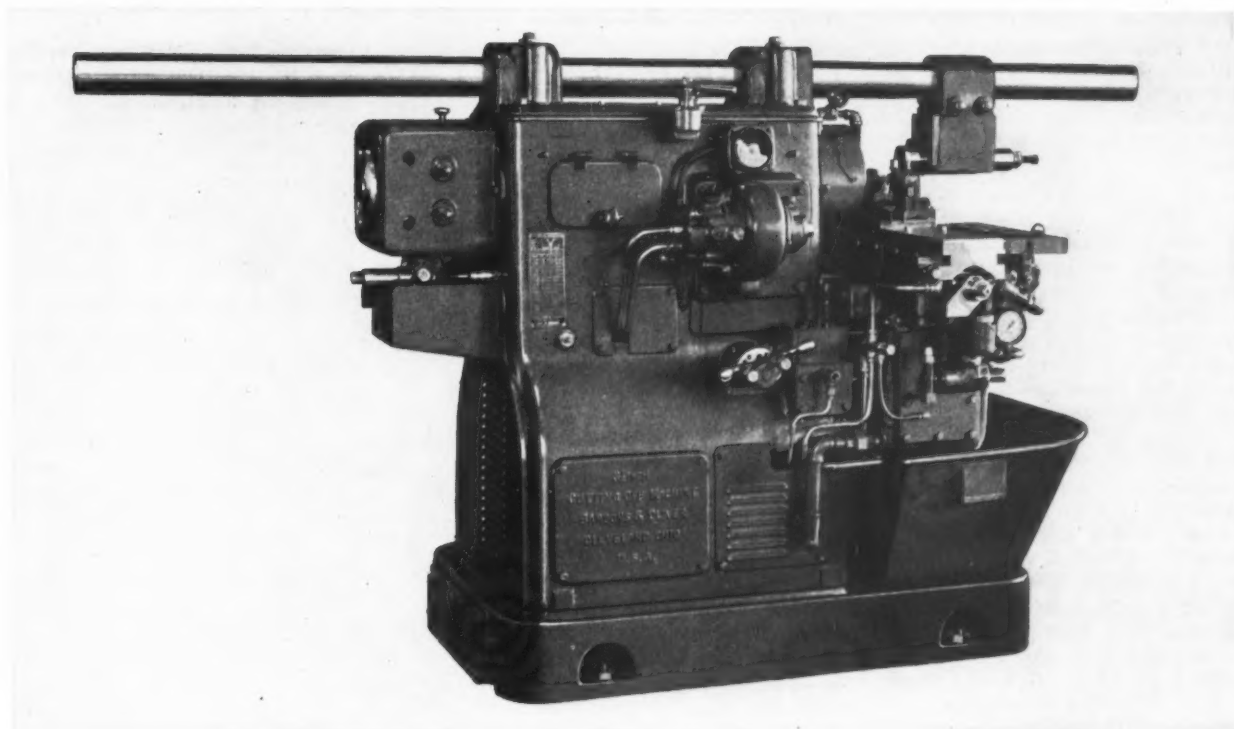
Mr. Strelinger had a very wide acquaintance not only among the many customers of the company, but among manufacturers as well. He is survived by a son, Gilbert P. Strelinger, of St. Louis, Mo.

* * *

Exports of industrial machinery from the United States in April, according to the Machinery Division of the Department of Commerce, Washington, D. C., were valued at \$22,717,849, the highest monthly value recorded since May, 1930. This represented a 43 per cent increase over the corresponding shipments in 1936, which amounted to \$15,886,369.

HIGHLY PRODUCTIVE

***Full Automatic Cutting Off Machines
for Solid or Tubular Round Stock***



Patented Under U. S. Patents 1696037 - 1972595

THE MACHINE ILLUSTRATED IS BUILT IN 3" - 3½" - 5¼" CAPACITY

These Machines Embody the Following Features:—

DOUBLE SYNCHRONIZED TOOL SLIDES
SLIDES HAVE RAPID APPROACH, FEED, QUICK RETURN
HYDRAULIC FEED PUMP WITH A WIDE SELECTION OF FEEDS
AIR OPERATED HINGED TYPE MASTER COLLET
AUTOMATIC ROLLER STOCK FEED
AIR OPERATED STOCK STOP
ALL MOVEMENTS OF SLIDES, COLLET, ROLLER FEED,
AND STOCK STOP ARE SYNCHRONIZED

THIS MACHINE IS ALSO BUILT SEMI-AUTOMATIC - HAND LEVER OPERATED

*We Manufacture a Full Line of Cutting Off Machines
Capacity—from 1/4" to 26"*

BARDONS & OLIVER, INC., CLEVELAND, OHIO

TURRET LATHES—CUTTING OFF MACHINES

MACHINERY, July, 1937—764-M

NEW BOOKS

VANADIUM STEELS AND IRONS. 189 pages, 6 by 9 inches; 71 photomicrographs and 178 charts and tables. Published by the Vanadium Corporation of America, 420 Lexington Ave., New York City. Price, \$1.25. (Available without charge to executives and engineers engaged in using or specifying alloy steels and irons, who request the book on business letter-heads.)

This new handbook of applied metallurgy is written for metallurgists, designing engineers, and others interested in the production, fabrication, and use of metals. It comprises a complete review of the chemical composition, physical properties, heat-treatment, applications, and fabrication of all irons and steels in which vanadium is an alloying element. Structural steels for light and heavy sections, SAE alloy and related high-test steels, spring steels, cast steels, tool steels, and nitriding steels are covered. In each case, the conditions under which most favorable results can be expected are specifically outlined and suggestions are made for correlating the choice of alloy steel and its heat-treatment with the fabricating process to be used. A special chapter is included on high-test alloy cast irons.

MACHINE SHOP OPERATIONS. By J. W. Barritt. 850 pages, 8 1/4 by 10 3/4 inches. Published by the American Technical Society, Drexel Ave. at 58th St., Chicago, Ill. Price, \$5.

This book consists of a collection of data on 280 actual machine shop jobs, bound together in a loose-leaf binder. The jobs included are typical of hundreds of major operations that a skilled mechanic is called on to do. They cover the use of measuring tools, laying out work, the drill press, shaper, vertical boring mill, horizontal boring mill, lathe, planer, slotter, milling machine, bench work, floor work, automatic machines, and the reading of working drawings. At the end of each section is a list of questions which will enable the student to test his knowledge. The author was formerly supervisor of apprentices at the Westinghouse Electric & Mfg. Co., and the book will be found well adapted for apprentice training classes and self-study.

HOW TO BE A GOOD FOREMAN. By Charles Reittel. 186 pages, 5 1/2 by 8 1/4 inches. Published by the Ronald Press Co., 15 E. 26th St., New York City. Price, \$1.50.

The author of this book is on the staff of an organization of management engineers, and has addressed many foremen's meetings. The interest in this subject, as evidenced by numerous requests for copies of his talks and for

the names of books on the subject, has suggested the present book. The purpose of the book is to help a man develop leadership and business ability. The questions discussed include hiring and training workers; discipline; working conditions; wages; routing work; materials and inventories; and costs.

COMING EVENTS

JUNE 28-JULY 3—Fortieth annual meeting of the AMERICAN SOCIETY FOR TESTING MATERIALS AND FOURTH EXHIBIT OF TESTING APPARATUS AND RELATED EQUIPMENT at Waldorf-Astoria Hotel, New York City. Headquarters of Society, 260 S. Broad St., Philadelphia, Pa.

SEPTEMBER 22-24—Fall meeting of the AMERICAN SOCIETY OF MECHANICAL ENGINEERS at the Hotel Lawrence, Erie, Pa. Clarence E. Davies, secretary, 29 W. 39th St., New York City.

SEPTEMBER 23-25—Conference of the NATIONAL INDUSTRIAL ADVERTISERS ASSOCIATION at Edgewater Beach Hotel, Chicago, Ill. For further information address National Industrial Advertisers Association, Inc., 100 E. Ohio St., Chicago, Ill.

OCTOBER 4-9—POWER AND MECHANICAL ENGINEERING EXPOSITION at the International Amphitheatre, Chicago, Ill. Further information can be obtained from the Executive Offices of the Exposition, Grand Central Palace, New York City.

OCTOBER 7-9—National Aircraft Production Meeting of the SOCIETY OF AUTOMOTIVE ENGINEERS at the Ambassador Hotel, Los Angeles, Calif. John A. C. Warner, secretary and general manager, 29 W. 39th St., New York City.

OCTOBER 18-22—NATIONAL METAL CONGRESS AND EXPOSITION to be held in the Atlantic City Auditorium, Atlantic City, N. J., under the auspices of the American Society for Metals, 7016 Euclid Ave., Cleveland, Ohio.

OCTOBER 27-NOVEMBER 3—NATIONAL AUTOMOBILE SHOW, at Grand Central Palace, New York City, under the auspices of the Automobile Manufacturers Association, 366 Madison Ave., New York City.

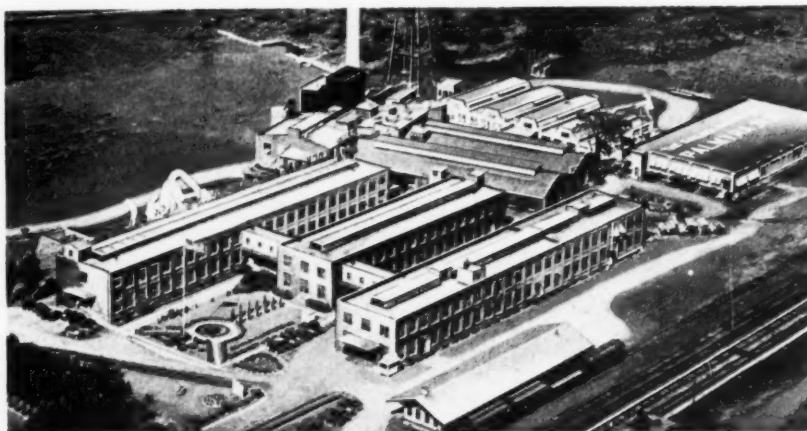
DECEMBER 8-10—National Production Meeting of the SOCIETY OF AUTOMOTIVE ENGINEERS at Flint, Mich. John A. C. Warner, secretary and general manager, 29 W. 39th St., New York City.

* * *

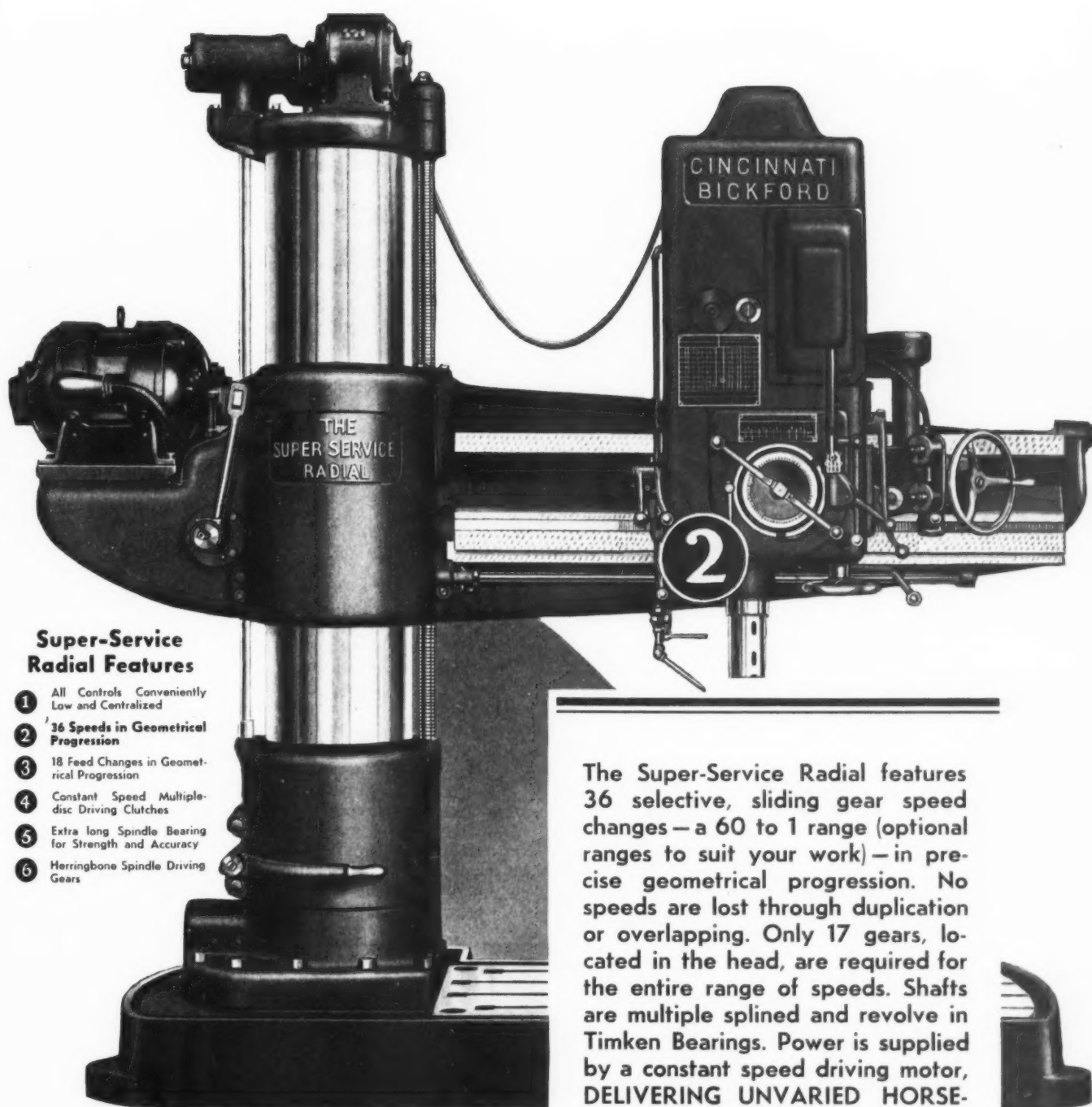
Garlock Packing Co. Celebrates Fiftieth Anniversary

This year the Garlock Packing Co., Palmyra, N. Y., celebrates its fiftieth anniversary. Shortly after the close of the Civil War, one of the subsequent founders of the Garlock Packing Co. conceived the idea of making mechanical packings by cutting a ring from an old piece of rubber hose and putting it in the stuffing box of an engine used to furnish power to a saw mill. The experiment proved so successful that similar packing rings and washers were cut from a supply of the same material and sold to the different users of steam engines throughout the vicinity. This was the beginning of the mechanical packing business.

In the year 1887, the Garlock Packing Co. was founded in Palmyra, and, with a handful of employees, started the first manufacture of mechanical packings on a commercial basis. Today, after a half century of progress, the company has over one thousand employees, and maintains sales offices and warehouses in the principal cities throughout the country. Branch factories are operated at Birmingham, Ala., Denver, Colo., and San Francisco, Calif.



Present Plant of Garlock Packing Co., which was Started Fifty Years Ago with a Handful of Employees



Super-Service Radial Features

- ① All Controls Conveniently Low and Centralized
- ② 36 Speeds in Geometrical Progression
- ③ 18 Feed Changes in Geometrical Progression
- ④ Constant Speed Multiple-disc Driving Clutches
- ⑤ Extra long Spindle Bearing for Strength and Accuracy
- ⑥ Herringbone Spindle Driving Gears

36 SPEEDS IN GEOMETRICAL PROGRESSION CONTROLLED AT THE HEAD

The Super-Service Radial features 36 selective, sliding gear speed changes—a 60 to 1 range (optional ranges to suit your work)—in precise geometrical progression. No speeds are lost through duplication or overlapping. Only 17 gears, located in the head, are required for the entire range of speeds. Shafts are multiple splined and revolve in Timken Bearings. Power is supplied by a constant speed driving motor, DELIVERING UNVARIED HORSE-POWER UNDER HEAVY, LOW SPEED CUTS. Characteristic of the Super-Service Radials, all controls are in the head, eliminating needless "walking between speed box and spindle." The new bulletin R-24 explains this outstanding feature—and many others—in full detail.

**THE CINCINNATI BICKFORD
TOOL COMPANY**

Oakley, Cincinnati, Ohio

SUPER-SERVICE RADIALS

rated firms. The present book deals with the relation between size and profits, size and income and outgo, size and turnover of capital, and size and dividends. It contains also an analysis of the profits of groups of specific large American corporations over various periods of time during the present century. A third volume, now in preparation, will deal with the subject of the compensation paid to corporate officers. A special committee, under the chairmanship of Ralph E. Flanders, president of the Jones & Lamson Machine Co., has had charge of the investigation, the findings of which are summarized in this volume.

THE PROPOSED FAIR LABOR STANDARDS ACT OF 1937. 9 pages, 5 3/4 by 8 1/2 inches. Published by the Machinery and Allied Products Institute, 221 N. LaSalle St., Chicago, Ill.

This little pamphlet contains a statement made by John W. O'Leary, president of the Machinery and Allied Products Institute, before joint hearings of the Committee on Education and Labor of the Senate and the Committee on Labor of the House of Representatives, concerning the effect of the proposed labor act on manufacturers of machinery and equipment.

MOTOR AND CONTROL APPLICATIONS. By George H. Hall. 259 pages, 6 by 9 inches. Published by the McGraw-Hill Book Co., 330 W. 42nd St., New York City. Price, \$3.

This book is planned to form a complete link between the motor and control and the tool or machine, and to assist the machine designer in selecting the right type of motor to meet require-

ments. It contains data on the latest types of motors and controls, together with information as to how they can best be applied to the various problems confronting the machine designer. No attempt is made to deal with the details of motor design, the aim being merely to present in a concise form the characteristics of the various types of motors and to describe the performance that may be secured from them by the selection of suitable control.

INTERNATIONAL ASSOCIATION FOR TESTING MATERIALS. Papers presented at the International Congress in London, April 19 to 24. Group A—Metals. 174 pages, 7 by 10 1/2 inches. Published by the secretary of the Congress, 28 Victoria St., London, S.W. 1, England.

THERMAL EXPANSION OF CEMENTED TUNGSTEN CARBIDE. By Peter Hidnert. 6 pages, 6 by 9 inches. Published by the United States Department of Commerce, Washington, D. C., as Research Paper RP-960 of the National Bureau of Standards. Price, 5 cents.

REPORT OF FOREMANSHIP TRAINING PROGRAM IN INDIANA INDUSTRIES. By G. F. Buxton. 40 pages, 6 by 9 inches. Published by Purdue University, Lafayette, Ind., as Extension Series No. 36 of the Engineering Extension Department.

WIRE ROPE. Safe Practices Pamphlet No. 26. 17 pages, 8 1/2 by 11 inches. Published by the National Safety Council, Inc., 20 N. Wacker Drive, Chicago, Ill.

New Departure Honors Men of Long Service

Three hundred and twenty-five employees of the New Departure Division of General Motors Corporation, Bristol, Conn., enjoyed a banquet and an evening of goodfellowship on July 8 as guests of the management. All those present had served twenty years or more with the company and were presented with gold service buttons designating the number of years of service. Those having served more than a quarter-century (123 in all) received Hamilton presentation pocket watches appropriately inscribed. F. G. Hughes, general manager, in his address to the gathering, emphasized the small turnover and very satisfactory employee relations existing in both the Bristol and Meriden plants.

* * *

Farrel-Birmingham Honors Old Employees

As a mark of appreciation for long and loyal service, 144 men were presented with twenty-five-year service pins by the Farrel-Birmingham Co., Ansonia, Conn., at a banquet on June 17, held in honor of employees who had served the company for twenty-five years or more. Of the men present, 100 had been connected with the company over thirty years, 37 over forty years, and 6 fifty years or more. Nelson W. Pickering, president of the company, acted as toastmaster. The principal address of the evening was made by James W. Hook, president of the Geometric Tool Co. and head of the New England Council.



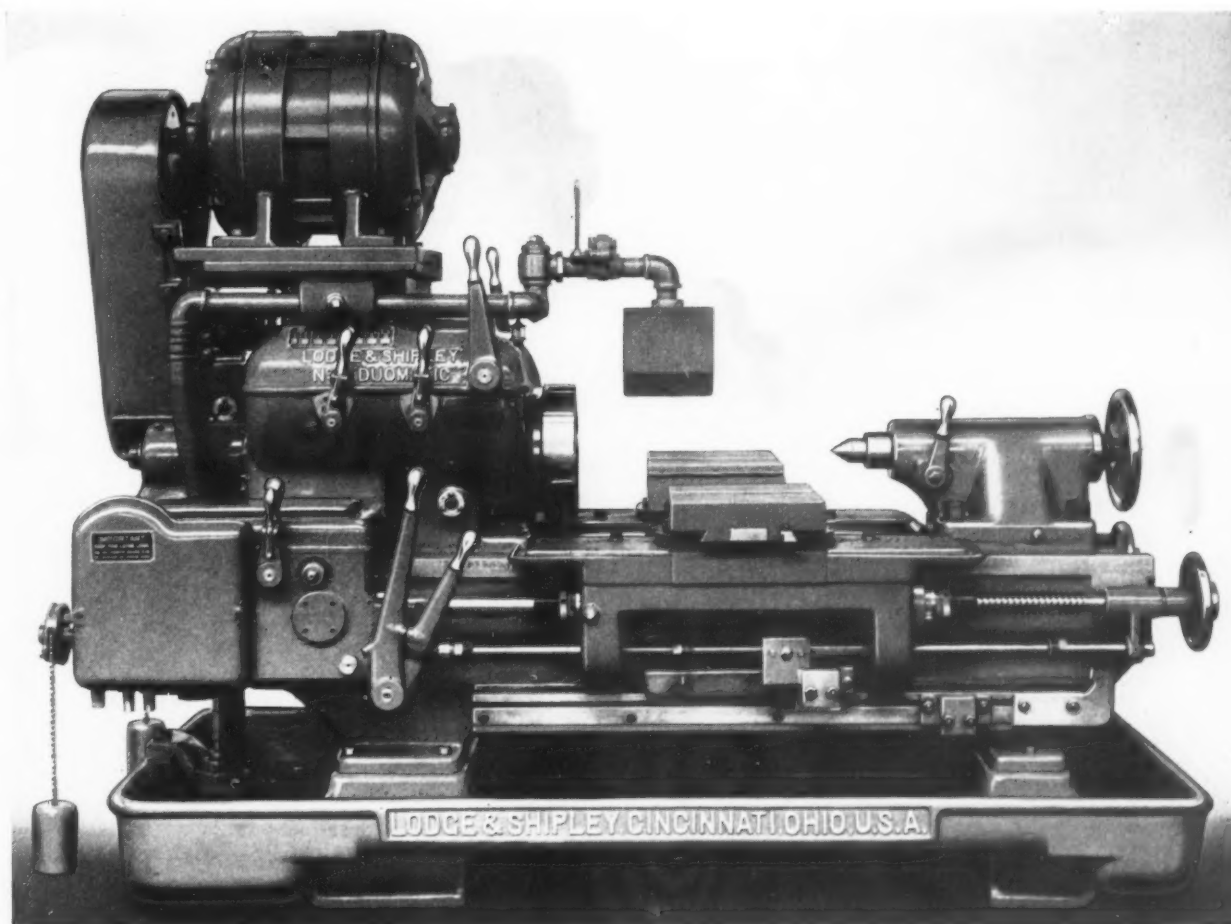
A Portable Gasoline-driven Generator Provides Electricity for the Operation of Portable Tools in Localities where Central-station Electric Current is not Available. The Generator is a Product of the Homelite Corporation, Port Chester, N. Y., and is Shown Being Used for Driving a Black & Decker Portable Electric Tool. All Portable Tools Made by this Concern can be Driven in this Manner as well as on Central-station Alternating or Direct Current

FOR GREATER PROFIT TO YOU

The ability to fit into any production picture has gained for the Lodge & Shipley No.3 Duomatic Lathe a world-wide reputation as a certain aid for production trouble.

Take the set-up illustrated; fitting taper attachments as standard equipment to the front and rear carriage of the Duomatic made a simple operation of the formerly difficult job of turning the cone-shaped valve.

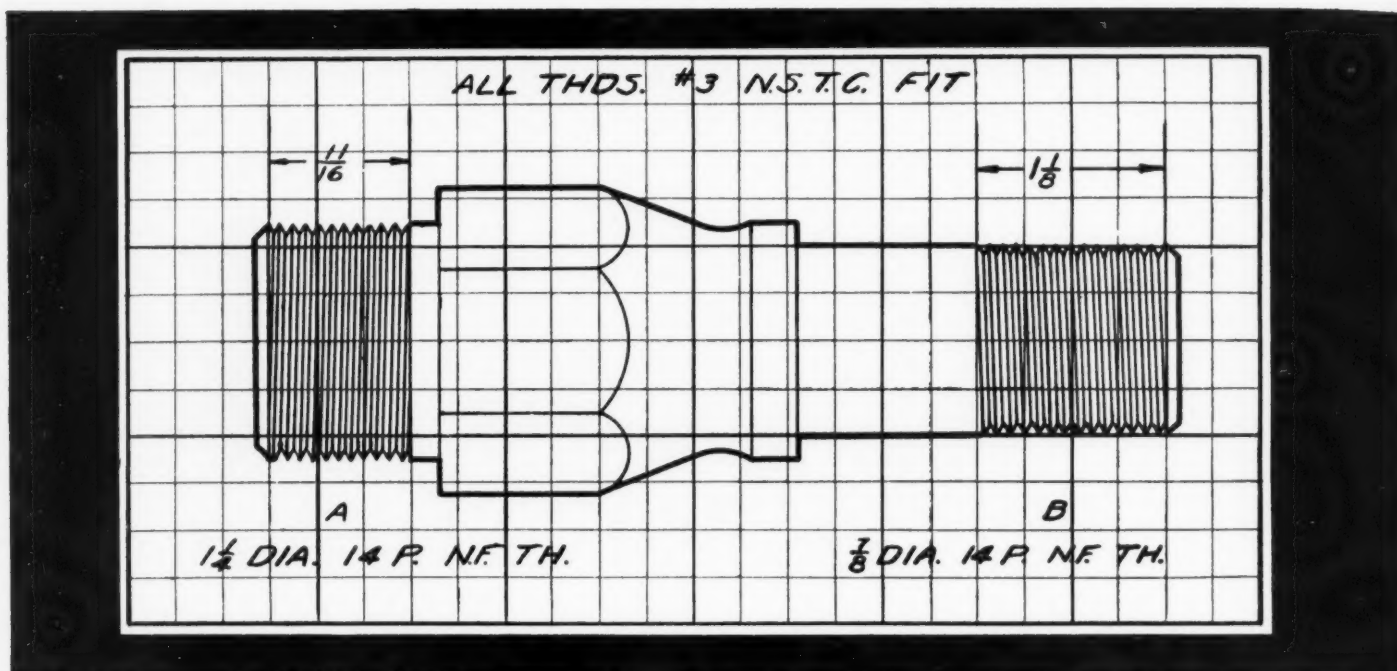
Our engineers have a wealth of experience that permits them to intelligently answer any inquiry as to the possibilities of the No. 3 Duomatic for your production problems.



The LODGE & SHIPLEY No. 3 DUOMATIC LATHE

HINE TOOL CO., CINCINNATI, OHIO

22 diameters with 3 sets of



To a user of die heads, it seems almost unbelievable that three sets of chasers could be used for cutting twenty-two separate and distinct threads.

The performance records of a 1 1/4" LANDMATIC Head installed by Charles N. Hough Mfg. Co., Franklin, Pa., manufacturers of oil-well equipment, is an outstanding example of this distinctive feature of LANDIS Die Heads.

The threads range from 7/8" to 1 13/16" diameter with 18, 16 or 14 pitch, N.F. threads. There are, by actual count, twenty-two different combinations of pitch and diameter, and all are handled by one set each 18, 16 and 14 pitch LANDIS Tangential chasers. Furthermore, the chasers produce from 1200 to 1400 threads between grinds—and all threads are held to a Class 3 fit.

Think of the saving!

LANDIS MACHINE CO., Inc. -

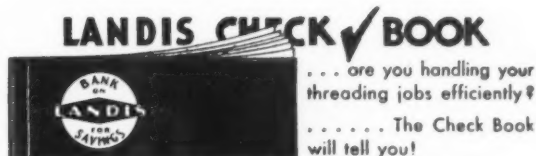
threaded chasers!



The economy in threading costs effected by the long life of the patented LANDIS Chaser is obvious.

It may not, however, be generally realized that there are other *distinctive* features to the LANDIS Chaser and Die Head which effect an even greater economy. These features are the *range coverage* of LANDIS chasers and the oversize capacity of LANDIS Die Heads.

Both features apply to *special* threads—and if you are cutting any special threads, it will pay you well to check with LANDIS.

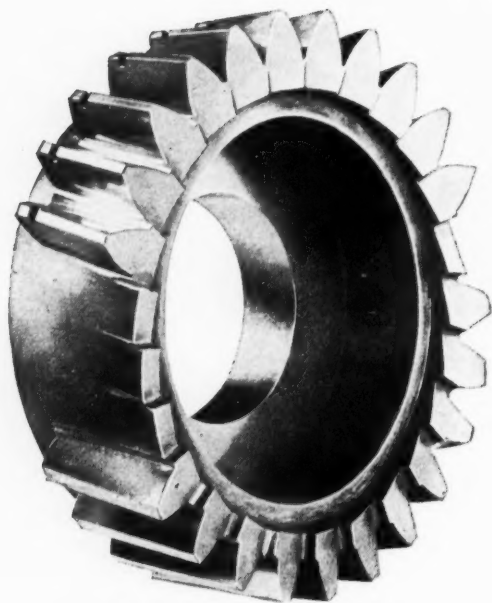


Write for your copy today

- - WAYNESBORO, PENNA.

MACHINERY, August, 1937—5

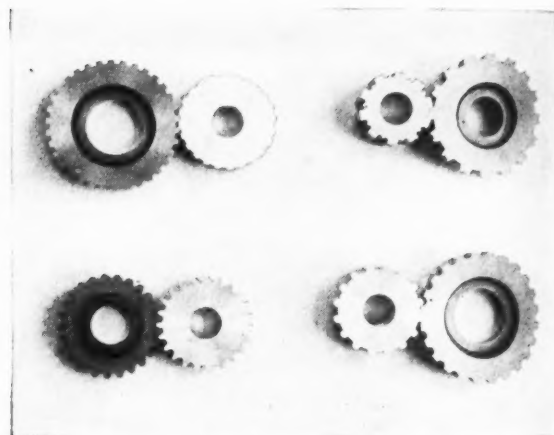
Standard



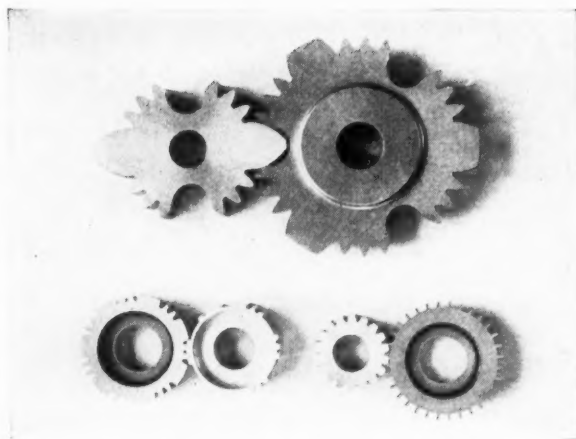
HELICAL TYPE GAP CUTTER



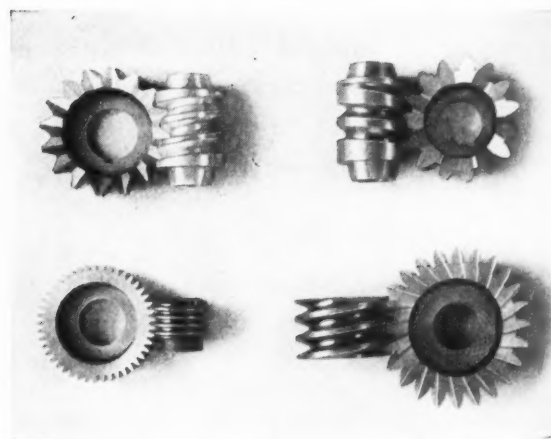
STANDARD SPUR CUTTER



Tooth Rounding Sprocket, Straight-sided and Involute Spline



Pump Gear, Interrupted Tooth and Gear-type Clutch

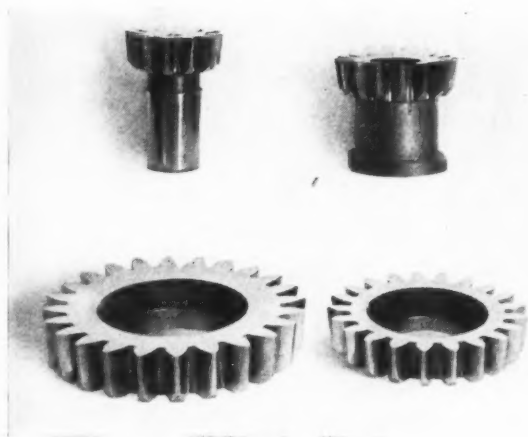


"Straight" and Hourglass-type Worms

The Fellows Line of Products includes:

GEAR SHAPERS • HOURGLASS GEAR SHAPERS • COMPLETE LINE OF CUTTERS • THREAD GENERATORS • MASTER GEARS • LAPS AND LAPPING MACHINES

or *Special* Purpose



Taper Shank, Hub and Disk



Right- and Left-hand Helical

Original **FELLOWS CUTTERS** set the **Standard for ACCURACY and ECONOMY**

If your gears or other parts can be produced by the generating process, Fellows makes cutters to cut them accurately and economically.

Over 40 years' experience in the making of Original Fellows Gear Shaper Cutters is at your service. During this period cutters have been made for cutting gears and other parts of every conceivable shape and description.

Our Cutter Department is equipped with special machinery designed and built exclusively for making Gear Shaper Cutters; hence you are assured of obtaining the most accurate cutter it is possible to make, and the benefit of 40 years' experience in the design and manufacture of fine cutting tools.

The Gear Shaper Method offers unlimited opportunities for producing many parts that cannot be economically made in any other way. If you think your problem is different, why not send blueprints of your work to our Engineering Department for consideration; or if you prefer, ask to have one of our engineers call upon you — without obligation on your part. The Fellows Gear Shaper Company, Springfield, Vermont—or 616 Fisher Building, Detroit, Michigan.

FELLOWS

• GEAR SHAPERS •
AND GEAR SHAPER CUTTERS

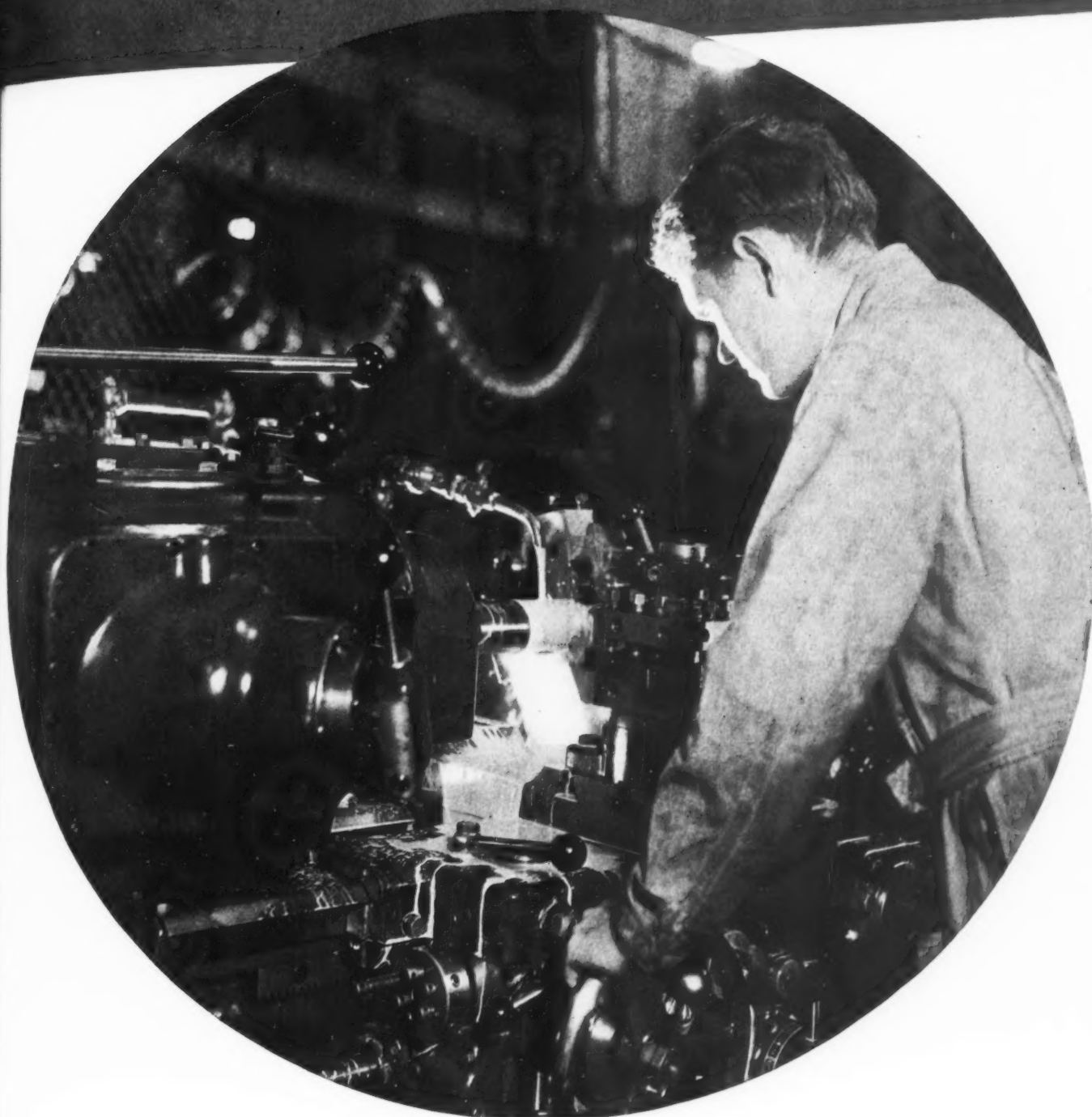
HELICAL CUTTER SHARPENERS

BURNISHING GEARS • TESTING EQUIPMENT

Minimum Maintenance

The line of J & L Universal Turret Lathes requires a minimum of maintenance. The machines are oiled by a force feed system—an automatic system which requires only an occasional glance at visual oil gauges. The apron and headstock bearings are lubricated by splash and force feed. All gears run in oil. A plunger pump in the aprons forces oil to all sliding surfaces in the carriage and carriage slide, and to the front and rear turret slide bearings, and the pinion shaft. Attention to such details makes the J & L Turret lathes outstanding.

**JONES & LAMSON MACHINE COMPANY
SPRINGFIELD, VERMONT**





CRAFTSMANSHIP

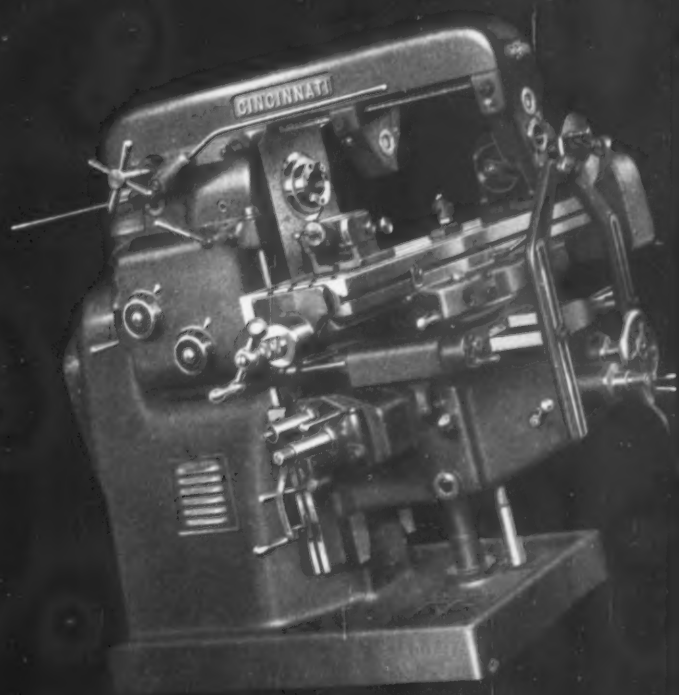
CINCINNATI

MILLING MACHINES • GRINDING MACHINES



Real craftsmen. The latest tools of their craft. Together they turn out work mighty close to perfection. For example, Dale, shown at the left, has been a Cincinnati gear craftsman for 21 years. He knows gear cutting in all its branches. During these years Dale and his fellow workers have been supplied with the most advanced tools of their craft. And as a result, machines bearing the CINCINNATI trade-mark are more lasting; smoother running; more quiet. You get the benefit of the experience and skill of hundreds of craftsmen like Dale, working with the latest equipment, when you specify machines bearing the CINCINNATI trade-mark.

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI GRINDERS INCORPORATED
CINCINNATI, OHIO, U.S.A.



PRODUCTIVITY + RELIABILITY
= *Continuity*



This Davis-Roto-matic, equipped with 8 spindle drill heads, has two New Departure Forged Steel Ball Bearings on each spindle.

● In modern mass production, important machine tools must be more than accurate and fast—they must be utterly reliable. The flow of work to many dependent machines and men must not be interrupted.

In the Davis Roto-matic 8 spindle vertical Drilling

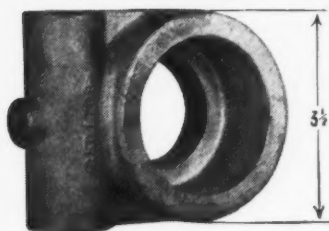
Machine, 104 New Departure Forged Steel ball bearings not only guarantee continuity of production, but they assure the low maintenance cost so essential to profits.

New Departure, Division General Motors Corp
Bristol, Connecticut, Chicago and San Francisco.

NEW DEPARTURE

THE FORGED STEEL BEARING

THIS JOB'S FINISHED
in 3 minutes
..SAVING 45%



GISHOLT TURRET LATHES

Sizes range from 1" to 12" bar capacity—up to 34" chucking capacity

● Costs took another licking in this big plant when new Gisholts were installed. This No. 4 Ram Type Universal Turret Lathe is used to machine many different parts including the bearing housing shown at the

left. Previous machining time on this part was 5½ minutes. With standard multiple tooling, this new Gisholt does the work in one operation—time is cut from 5½ to 3 minutes from floor to floor. A saving of 45%.

These features, found only in Gisholt Turret Lathes, are responsible for this saving:

- ★ Heavy, rigid construction built to withstand multiple cutting and high cutting speeds.
- ★ 12 speed headstock and 8 power feeds in both carriages give a selection of cutting speeds and feeds best suited to the job.
- ★ Automatic spindle brake saves time in shifting to different speeds; also in quicker positioning of spindle when chucking the piece.
- ★ The use of multiple turning heads with overhead pilots.
- ★ Automatic indexing and clamping of the hexagon turret and quick indexing and clamping of the square turret tool post, speeds up the cycle of operations.
- ★ Selective gear transmission saves time in permitting direct shifting from a high to a low speed or vice versa.
- ★ Easier, faster operation with simple controls and less effort.

There are many new Gisholt features that can save time and money in your plant. Why not get full information?

With Gisholt standard multiple tooling, the machining of this bearing housing is combined in one operation, as follows: Place casting in the chuck—bore small and large holes—counter bore—form three grooves at once—ream smaller hole—finish ream both holes with double reamer.

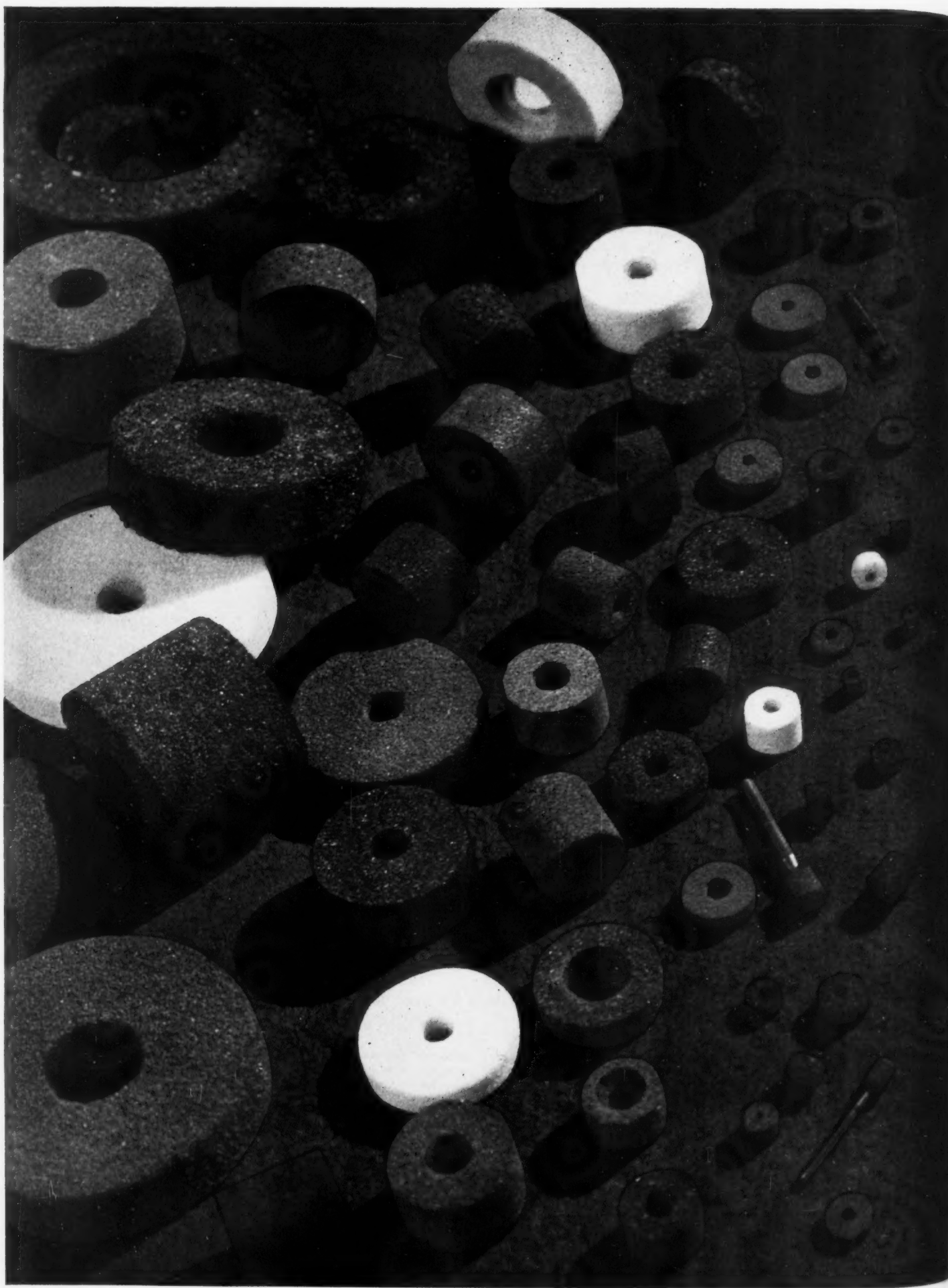
A NEW CATALOG

Your copy of the new Gisholt Catalog of Standard Tools for Ram Type Turret Lathes is ready for you. Drop us a postcard and it will be sent by return mail.



GISHOLT MACHINE COMPANY

1209 EAST WASHINGTON AVENUE, MADISON, WISCONSIN, U. S. A.
 TURRET LATHES • AUTOMATIC LATHES • TOOL GRINDERS • BALANCING MACHINES



14—MACHINERY, August, 1937



THE GRINDING WHEEL

is the HEART
of the Modern
High Production
Internal Grinder

THE controls of today's high production automatic and semi-automatic internal grinders are built around the grinding wheel. Probably in more than any other type of grinder the performance of the machine depends on the performance of the wheel.

Several years ago Norton Company developed and introduced its D-Wheel* for this severe service—a new type wheel that brought new standards to internal grinding—a wheel with increased ability to hold shape and size, to cut faster and reduce grinding pressure lessening the tendency of springing the spindles and producing bell mouthed holes.

Today Norton Company has still further improved internal grinding standards. In many plants the new "B-E" Wheel is producing a marked decrease in grinding costs.

IN THE TOOL ROOM 38 Alundum Abrasive is particularly effective for the hundreds of miscellaneous internal grinding jobs on hard, tough steel alloys.

*Now designated as Structure 4.

NORTON COMPANY, WORCESTER, MASS.

New York
Hartford

Chicago
Cleveland
Wessling, Germany

Detroit
Hamilton, Ont.
Corsico, Italy

Philadelphia
London
Corsico, Italy

Pittsburgh
Paris

Tools for the Tough Jobs!

UNION TOOLS

Union Tools know what hard work is—and they like it! Rugged, reliable, accurate performance is their nature. Try them first in the toughest job in your plant and we are sure they will become—

"The Tools You Buy Again"

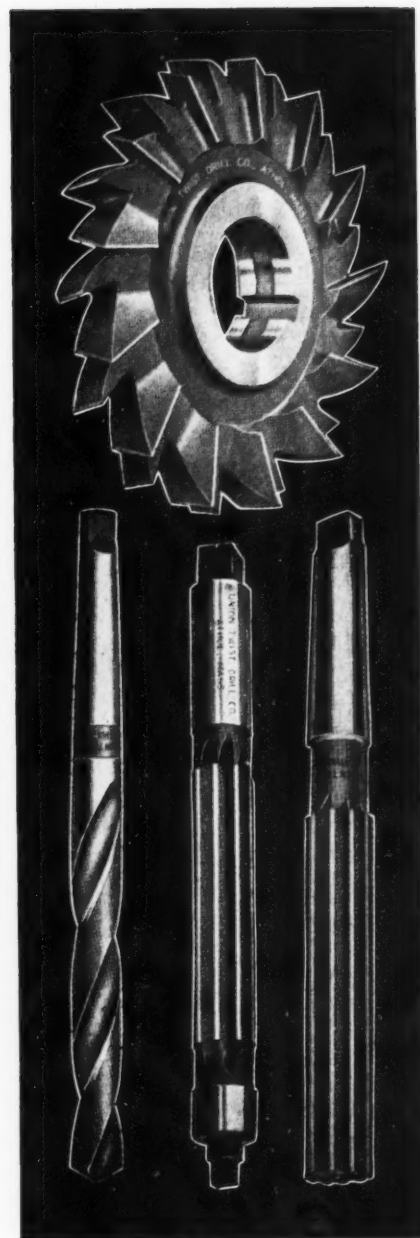
UNION TWIST DRILL CO. ATHOL - - - MASS.

New York: 61 Reade St.
Chicago: 11 So. Clinton St.
Los Angeles: 168 So. Central Ave.

Detroit: 6540 Antoine St.
San Francisco: 121 Second St.

Derby Line, Vt. Butterfield Div.
Rock Island, Quebec. Butterfield Div.
Mansfield, Mass. S. W. Card Mfg. Co. Div.

TWIST DRILLS
MILLING CUTTERS
HOBS—REAMERS
SPLITTING SAWS
END MILLS
TAPS—DIES
SCREW PLATES
ETC.



You, too, will find that it pays to use "American" Multi-Production Lathes—modern, fast, powerful and accurate—designed and built to get the best out of cemented carbide cutting tools.

THE AMERICAN TOOL WORKS CO.

OHIO, U. S. A.

LATHES ★ RADIALS ★ SHAPERS

Why will High Cycle Tools Speed up my Production?



Because they Maintain Speed and Power under Heavy Loads!

MAINTAINED speed and power under the most severe conditions—are the characteristics which set speed records in horse-racing and on the production line as well. And when it comes to maintaining speed, High Cycle Tools win “in a walk” for they register a decrease of only 20% between no-load and stalling points, while other types of tools show decreases up to 60%.

High Cycle Tools speed production and cut costs by increasing your per-man output—particularly on tough nut-running, stud-setting, drilling, sanding and grinding jobs. And their light weight, freedom from power losses and low maintenance costs on tools and power supply systems are other important reasons why manufacturers

are swinging to Black & Decker-Van Dorn High Cycle Tools in fields where rapid, low-cost production is essential.

HOW MUCH WILL HIGH CYCLE TOOLS INCREASE PRODUCTION?

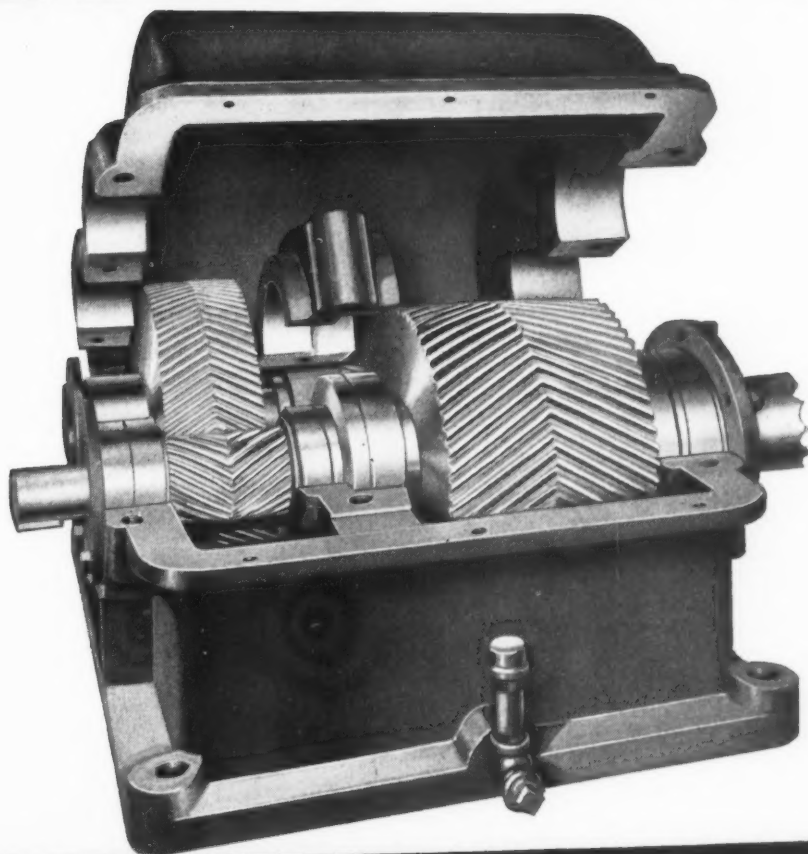
That's easy to find out definitely. A Black & Decker-Van Dorn High Cycle Engineer will gladly make a survey of your production operations and give you an accurate report—without obligation on your part, of course. For further information and catalog, write: High Cycle Division, Black & Decker-Van Dorn, 735 Pennsylvania Avenue, Towson, Maryland.

**BLACK & DECKER-
VAN DORN High Cycle TOOLS**

DRILLS REAMERS SCREW DRIVERS NUT RUNNERS TAPPERS STUD SETTERS SANDERS GRINDERS DIE GRINDERS

Made by the World's Largest Manufacturer of Portable Electric Tools

LINK-BELT



HERRINGBONE GEAR REDUCER

Send for these Books



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REDUCERS

Worm Gear
Reducer Book
No. 1524.

MACHINERY, August, 1937—19

YOU TEST THEM!



TRADE MARK



Socket Screws

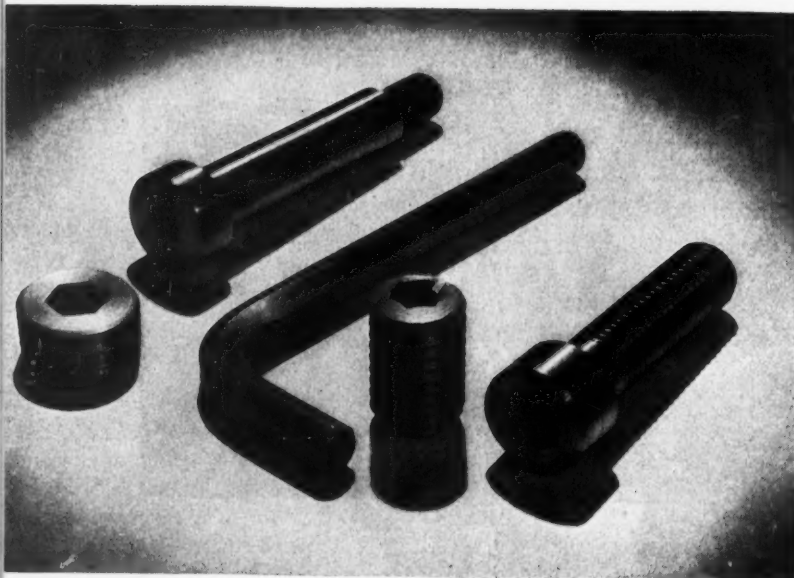
Quality Inside and Out!

Ten-Tor Testing—an exclusive Holo-Krome feature—is more severe than any normal test you would make; nevertheless—You Test Them!

After you have made your test, you will agree Holo-Krome FIBRO FORGED Socket Screws are the Standard of Value.

FREE TEST OFFER — Write our Department "K", giving style, size and quantity, and the screws required are yours for the writing.

THE HOLO-KROME SCREW CORPORATION
HARTFORD, CONNECTICUT, U. S. A.



The Standard of Value

HOLO-KROME

HARDINGE *Cataract*

PRECISION BENCH LATHES & BENCH HAND SCREW MACHINES

AT:  **INTERNATIONAL
BUSINESS
MACHINES**

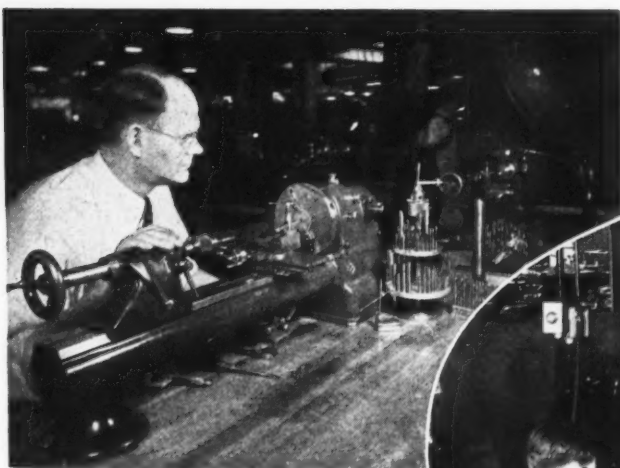


Rapid and Accurate Finishing of Gear Assemblies



A Battery in One of the Special Production Departments

A STATEMENT from the INTERNATIONAL BUSINESS MACHINES CORPORATION:



Special Accuracy Work

ASK FOR
BULLETINS DESCRIBING
THESE
MODERN MACHINES

"These new type preloaded ball bearing Bench Lathes manufactured by Hardinge Brothers, Inc., Elmira, New York, are very satisfactory, and through their use we have been able to increase our production and decrease our costs."

A. H. HANCOCK
Superintendent



In the Center of Activity in the Tool Room

Hardinge "Cataract" Precision Bench Lathes and Hand Screw Machines play an important part in the Tool Room, Production Departments, Inventing and Development Departments, Engineering Laboratory, and are being installed in the New Training School of the International Business Machines Corporation.

HARDINGE BROTHERS, INC., ELMIRA, N. Y.

CHICAGO - NEW YORK - PHILADELPHIA - DETROIT - HARTFORD

Precision Machine Tools Since 1890

OPERATOR INTEREST... INCREASED PRODUCTION



—go hand and hand with **SUNOCO**

OPERATION:

Precision grinding diameters,
15/16", 5/8" and 3/4" on
feed shaft.

MACHINE:

Cincinnati 6 x 30 Plain
Hydraulic Grinding Machine.

MATERIAL:

Chrome nickel steel

LIMITS:

Minus .001" on 15/16" diam.
Minus .0015" on 5/8" diam.
Minus .002" on 3/4" diam.

PRODUCTION:

10 pieces per hour—three
operations on each piece.

METHOD EMPLOYED:

Plunge-cut and traverse grind-
ing.

COOLANT:

One part SUNOCO to 20
parts water.

*Courtesy of Cincinnati Grinders
Inc., Cincinnati, Ohio.*

NEW grinding machines, flexible
in operation and designed to
maintain closer tolerances — plus
operator interest in greater produc-
tion per work hour—depend on
the grinding coolant for efficient
production.

SUNOCO is the grinding cool-
ant to assure efficient production
consistently. In the grinding opera-
tion it has made possible closer

limits of accuracy, faster stock re-
moval without increasing wheel
wear, and yet has reduced to a
minimum the danger of burning
the work.

For mirror finishes, greater pre-
cision, and increased production
per abrasive unit specify the mod-
ern grinding fluid developed to
meet every grinding requirement—
SUNOCO Emulsifying Cutting Oil.

SUNOCO

EMULSIFYING
CUTTING OIL

SUN OIL COMPANY, PHILADELPHIA, PA., U. S. A.

Offices and Warehouses in more than 100 cities

Subsidiary Companies:

Sun Oil Co., Ltd., Montreal, Toronto • British Sun Oil Co., Ltd., London, England

BIG

ENOUGH FOR THE JOB !

Only helical Spring Washers
ADEQUATE in size and Power
will Keep Machinery tight

Not only *Live Action* . . . but a
sufficient amount of it is indis-
pensable in combating wear and
vibration. Every correctly designed
bolted assembly *must* include
helical Spring Washers . . . ade-
quate in size and power to keep
parts as tight as the designer
intended.

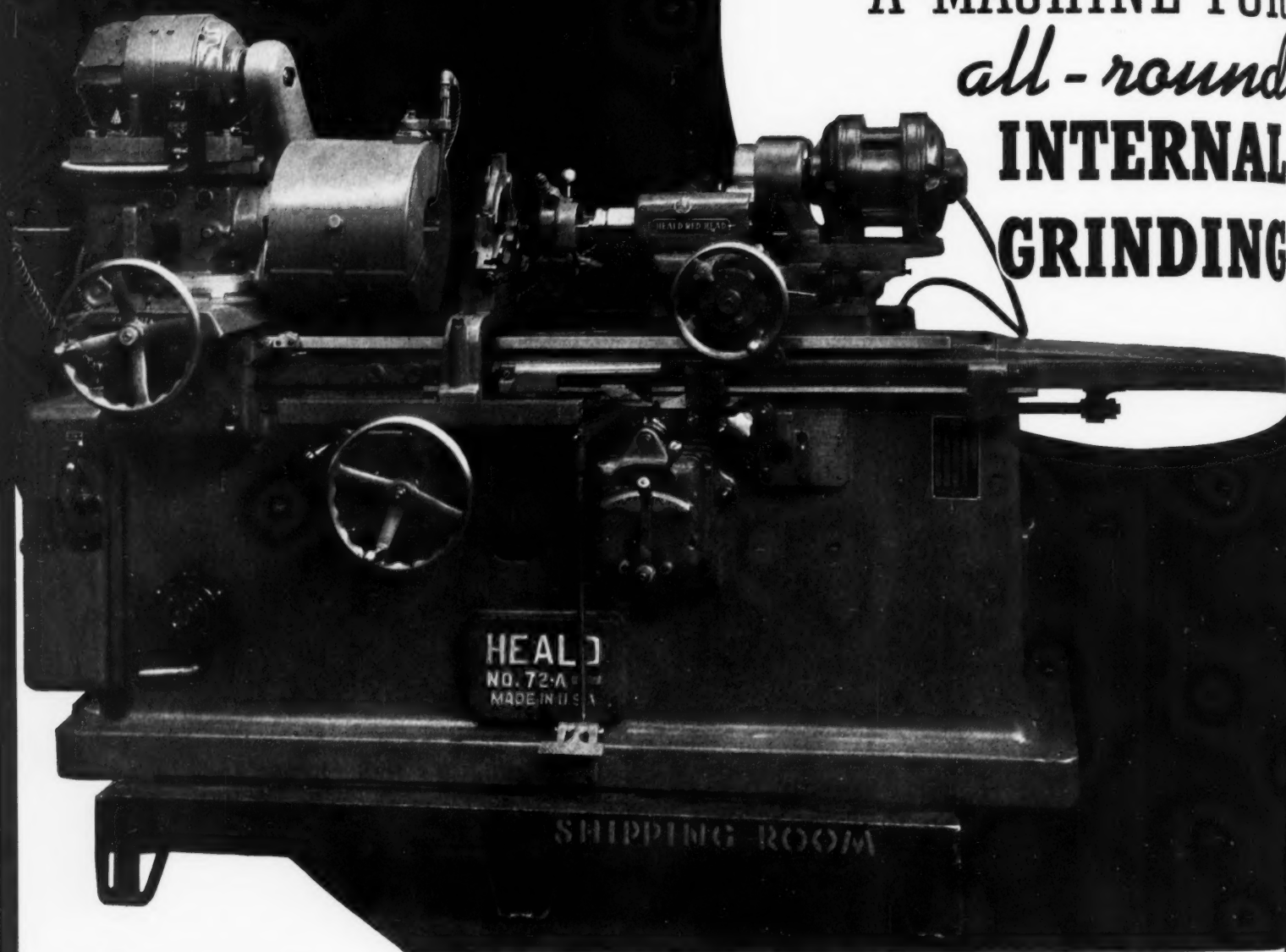
SPRING WASHER INDUSTRY

616 WRIGLEY BLDG., CHICAGO, ILL.

ONLY A HELICAL SPRING WASHER HAS ADEQUATE RANGE OF *Live Action*

Ready to GO...

A MACHINE FOR
all-round
**INTERNAL
GRINDING**



AS IS often understood, many of our machines are used by manufacturers having mass production but it is equally true that a large number are sold for miscellaneous work such as found in tool rooms or on a variety of parts in small lots.

In both cases the accuracy and quality obtained combined with convenience of operation produces results unequalled with any other equipment.

Above is a No. 72A Plain Internal ideally arranged for general work. In fact, it is almost a universal tool. To mention one or two units:

It has an individual motor drive for wheelhead workhead and hydraulic system.

Hydraulic controlled movement for the table.

Cross slide under the workhead.

Hand feed for the table.

Steady rest for long work.

Universal holding fixtures with capacity for various sizes of work can be supplied.

And remember this is only one of a complete line of internal grinding machines. Whatever your particular requirements, there is sure to be a Heald just suited to handle them.

THE HEALD MACHINE CO., WORCESTER, MASS., U. S. A.

The OXWELD* CM-16

A 45-Pound Oxy-Acetylene Machine for Cutting Steel

The new Oxweld CM-16 portable cutting machine—priced at \$175.00† makes available to you many of the advantages of oxy-acetylene machine cutting, at a price never before so low.

The CM-16 is one of a complete line of portable and stationary machines. It can cut steel plate up to four inches thick in straight lines and circles automatically—or when guided by hand, it can cut irregular shapes.

The Oxweld CM-16 Machine is compact, easy to manipulate and especially useful when it is necessary to move the machine from job to job. Write for a descriptive folder to—

The Linde Air Products Company, Unit of
Union Carbide and Carbon Corporation, New
York and principal cities.

*Trade-Mark

† Prices slightly higher west
of the Rocky Mountains



\$175⁰⁰ complete

Everything for Oxy-Acetylene Welding and Cutting

LINDE OXYGEN • PREST-O-LITE ACETYLENE • OXWELD APPARATUS AND SUPPLIES

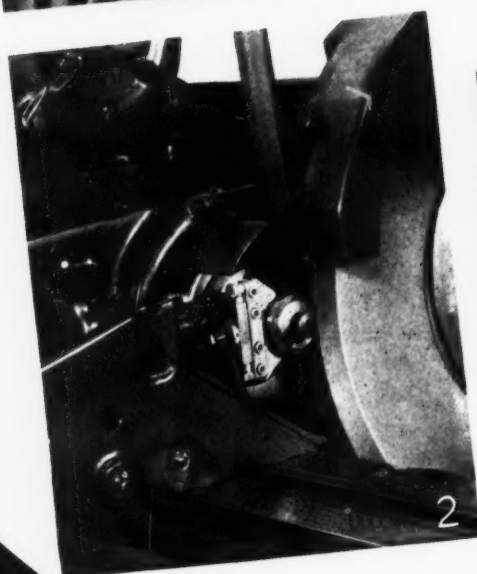
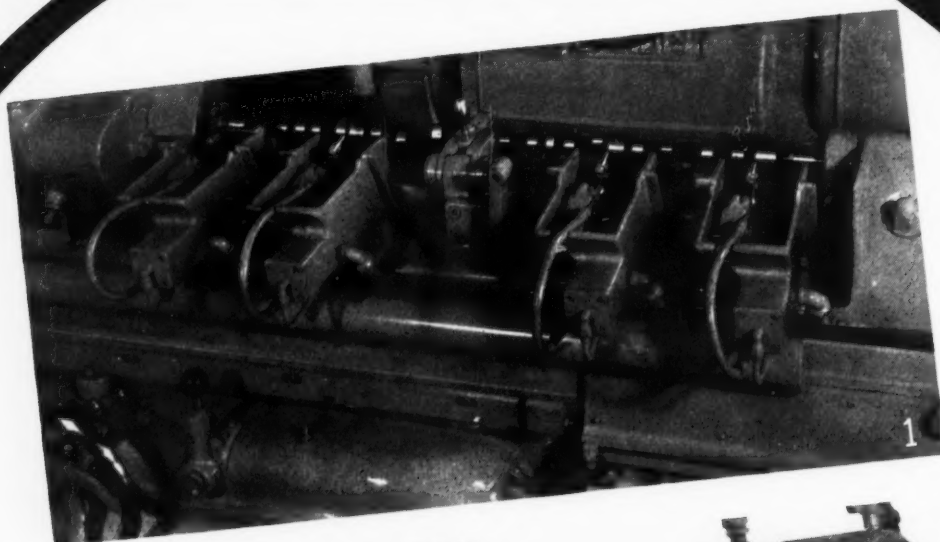
FROM



LINDE

UNION CARBIDE

Another... LANDIS



LANDIS TOOL
WAYNESBORO

DIS *Feature*

AUTOMATIC PRECISION With Landis-Solex Sizing

LANDIS-SOLEX Sizing was announced several years ago. Since then an ever growing list of successful applications has proved its complete practicability for certain classes of work. What can be expected of it is best told by the actual performance records covering the applications shown.

(1) Operation—finish grind four camshaft bearings on same shaft. Stock removed—.008". Production—35 shafts or 140 bearings per hour. Limits—.001" for size, .0002" for taper. The operator at the same time finish spot grinds the center bearing on a hand operated machine.

(2) Operation—rough grind the outside diameter of an inner roller bearing ring. Stock removed—.018". Production—133 per hour. Limits—plus or minus .0005". Finish grinding and removing

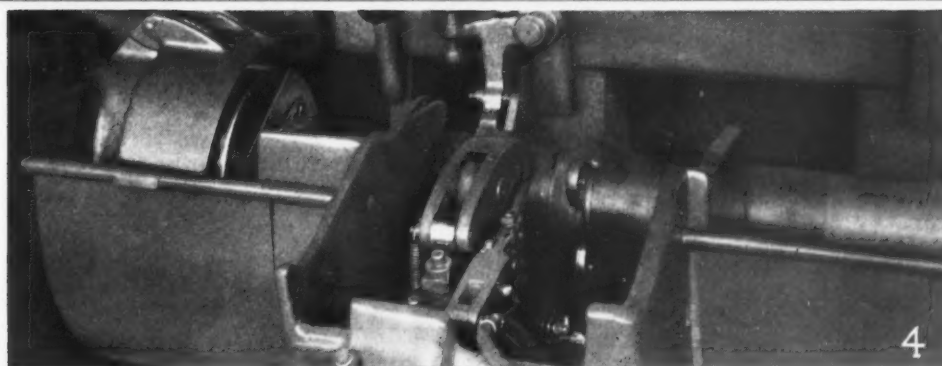
.003" stock, production is 100 per hour within limits of .0003".

(3) Operation—finish grind the two hub diameters of differential case. Stock removed—.010". Production—90 per hour per machine with one man operating two machines. Limits—plus .0002", minus .0003".

(4) Operation—finish grind the three outside diameters of a rear axle housing tube and flange assembly. Stock removed—.020" to .025". Production—50 to 60 per hour.

When such precision can be automatically and rapidly secured you cannot afford *not* to investigate. Landis engineers will quickly tell you whether Landis-Solex sizing will prove a profitable investment.

234



COMPANY

PENNSYLVANIA

Modern GARDNER GRINDERS

for
TODAY'S
TOUGH
requirements!

EVEN in the relatively simple, hand-operated Single Spindle Disc Grinder, 1937's requirements call for increased rigidity, with improved design.

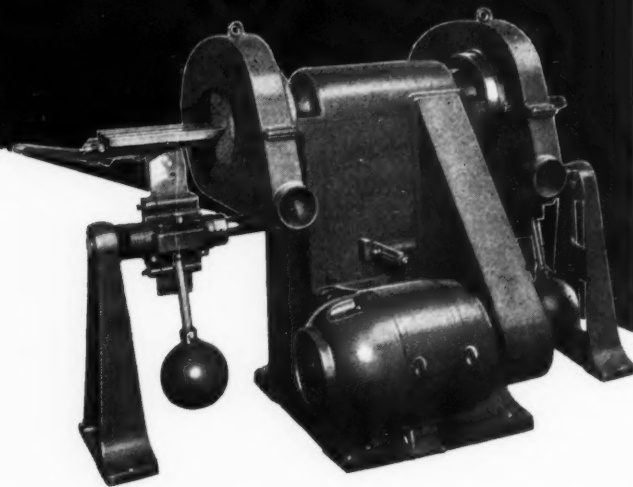
Gardner "200" Series Grinders are right "up with the times" in these respects.

Below is shown one of these modern tools—a 26" unit—grinding parts for Power Take-Offs in a Detroit factory, at the rate of 50 to 60 per hour.

Get full details on these machines—

WRITE FOR BULLETIN 200B!

GARDNER MACHINE CO., 414 E. Gardner St., BELOIT, WISCONSIN, U. S. A.

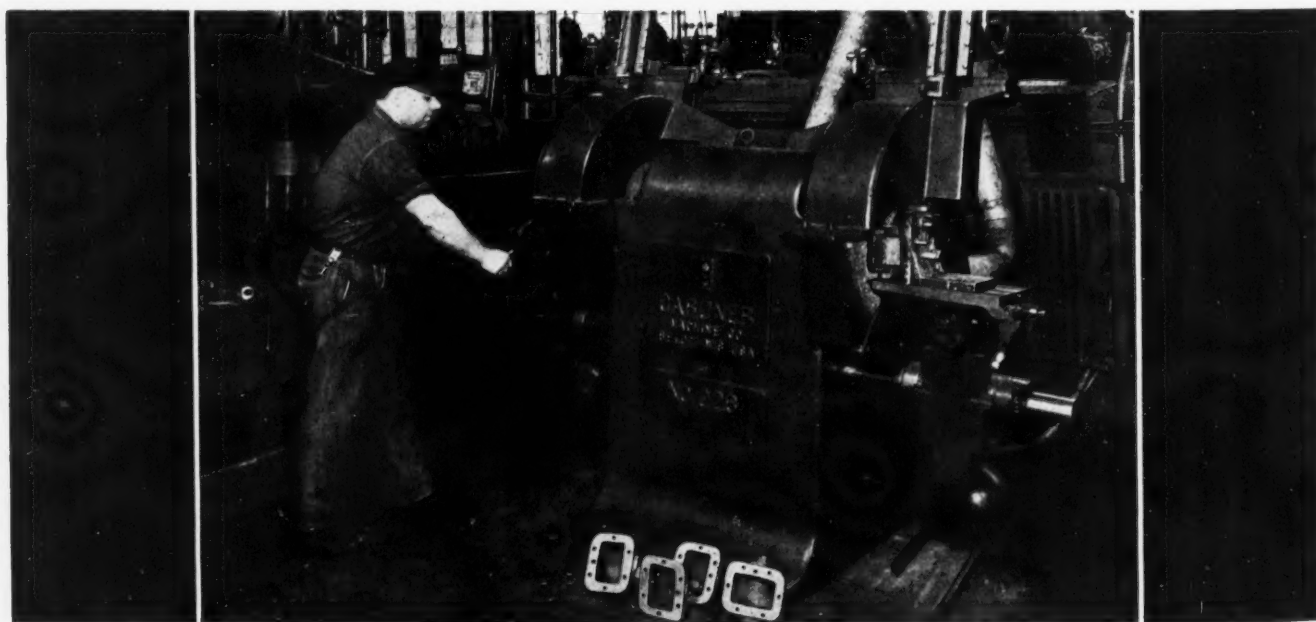


SHOWING MODERN MOTOR MOUNTING

GARDNER FEATURES

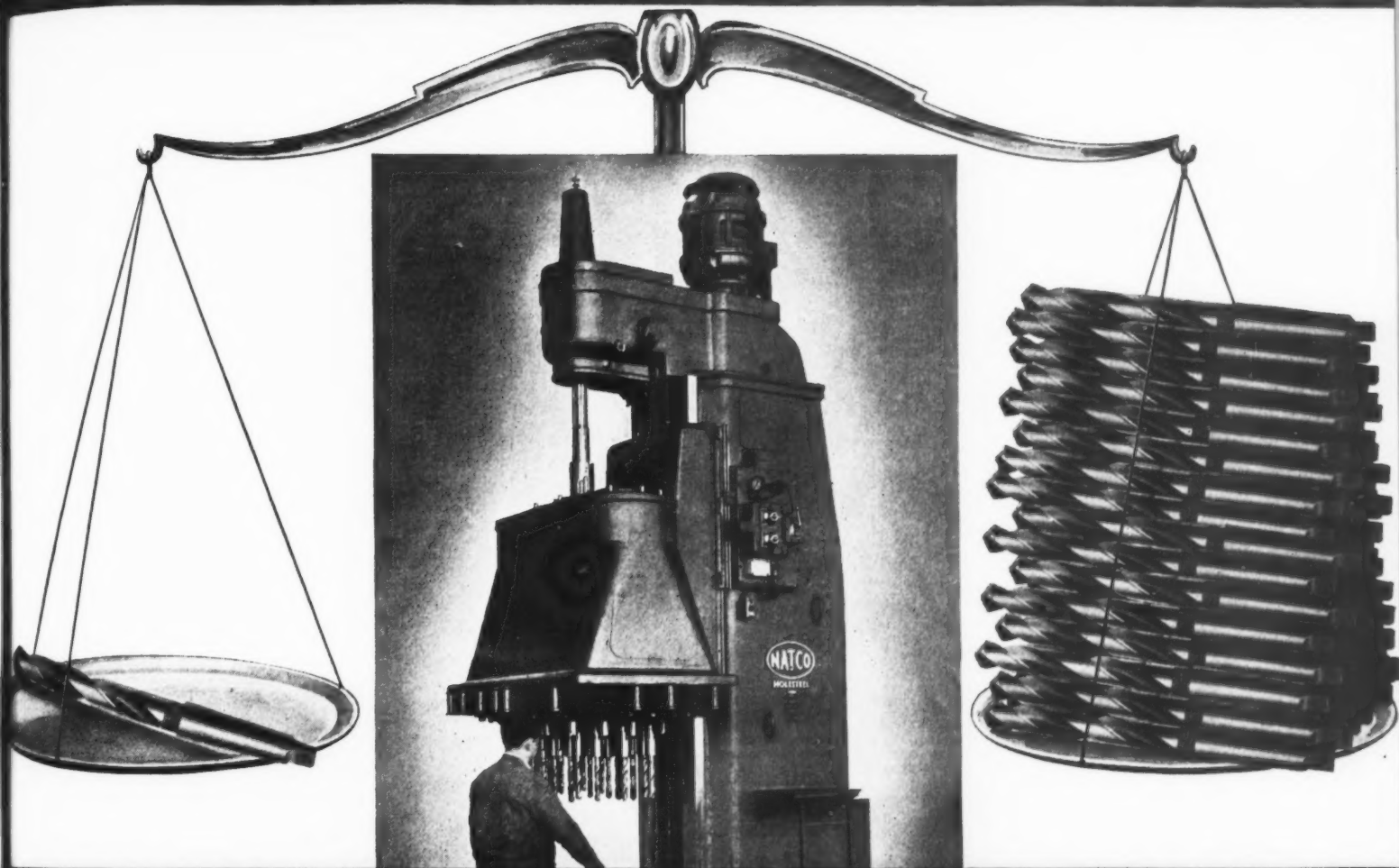
("200" Series Grinders)

1. Added weight and rigidity.
2. Greater accuracy of work produced.
3. Modern abrasives and hoods.



PROGRESS

IN MANUFACTURING DRILLS AND REAMERS



ONE OR 200...but Trustworthy All!

Drills, Reamers, and other cutting tools are really "Trustworthy" when their use in multiple drilling definitely helps to reduce production costs.

Trustworthiness in "Cleveland" Tools is a recognized quality that results from this Company's extreme care, all through the years of the greatest industrial development, to build up *knowledge* of what our products must be and do, in advance of actual manufacture.

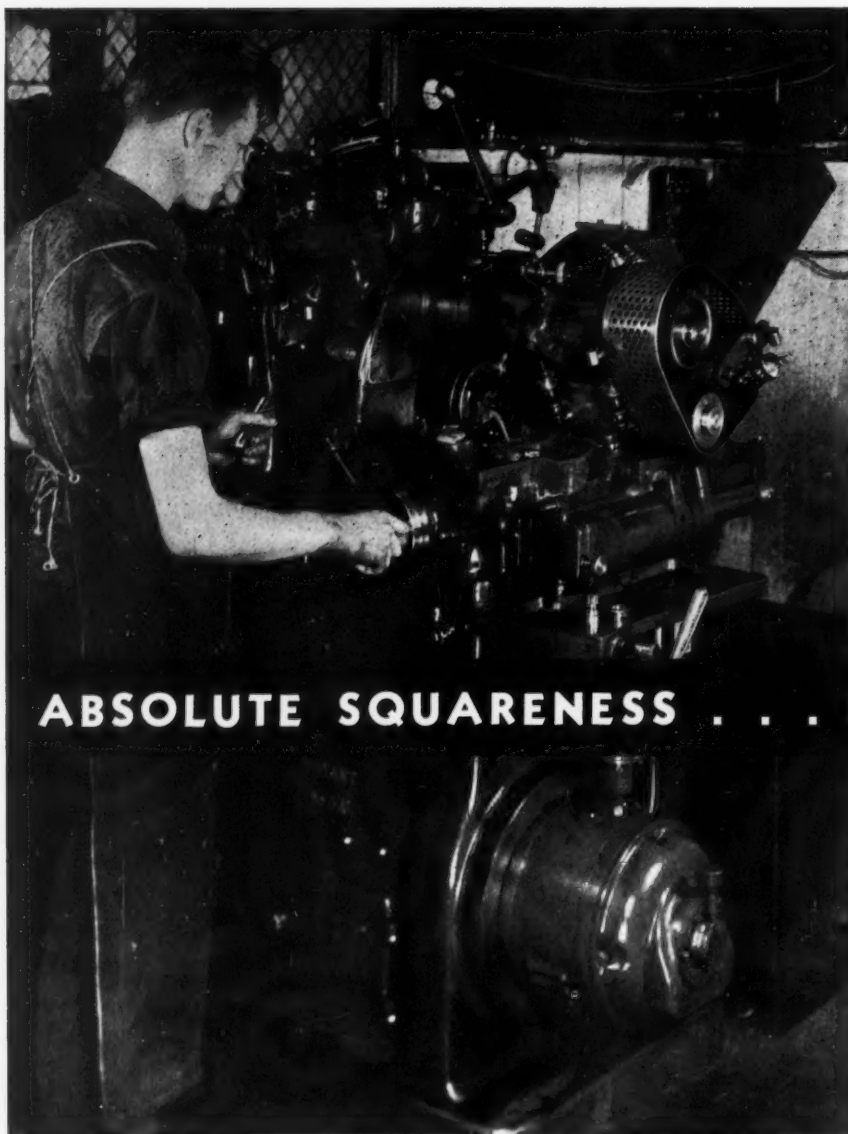
The programs of research by which this knowledge is gained are elaborate and are carried on constantly. They cover every important detail—metallurgy, chemistry, heat treating, design and engineering—and the vital information they disclose is always at your service.

If you are having trouble with any drilling or reaming, or other cutting tool operations, send for a "Cleveland" Representative—his experience should prove valuable and his counsel worth your consideration.

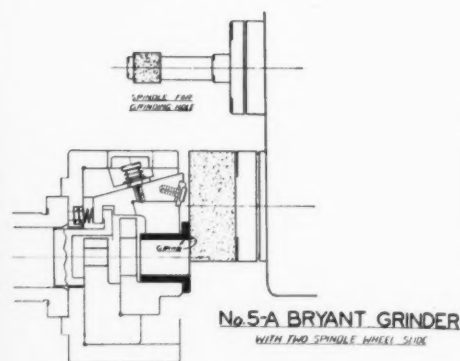
The CLEVELAND **TWIST DRILL COMPANY**
TRADE MARK REG. U. S. PAT. OFF. AND FOREIGN COUNTRIES
 1242 EAST 49TH STREET
 CLEVELAND
 30 READE ST. NEW YORK 9 NORTH JEFFERSON ST. CHICAGO 654 HOWARD ST. SAN FRANCISCO
 6515 SECOND BLVD., DETROIT LONDON - E. P. BARRUS, LTD. - 35-36-37 UPPER THAMES ST., E.C.4



"CLEVELAND" DISTRIBUTORS EVERYWHERE ARE READY TO SERVE YOU



**Hole and face
your small
work in one
operation . . .**



ABSOLUTE SQUARENESS . . . NO REHANDLING



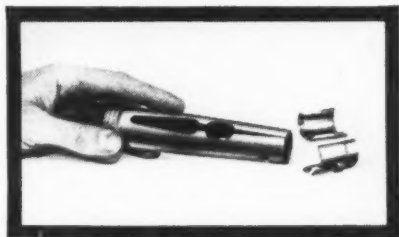
ON many small parts it is important to have the face ground absolutely square with the hole. . . . The illustration shows a Bryant 5-A Machine grinding the hole and face of a small cylinder in one chucking of the work. This machine makes it possible to use the right grade and grain of wheels for different surfaces. Also the proper wheel speeds to give the best finish and highest production. No time lost in handling. Send us prints or sketches of your work for estimates. . . .

BRYANT

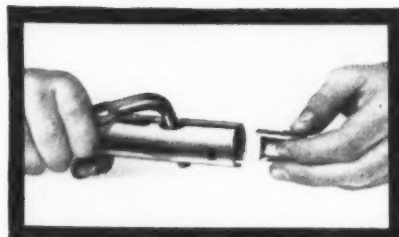
**Chuckling Grinder Company
Springfield, Vermont, U. S. A.**

BROWN & SHARPE MASTER FEEDING FINGER

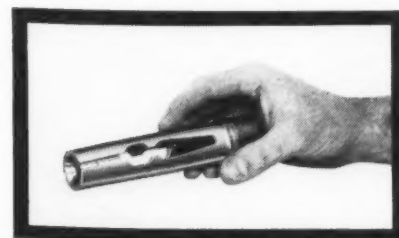
WITH INTERCHANGEABLE
PADS OF
HARDENED STEEL
BRONZE
CAST IRON



MASTER FINGER AND PADS



MASTER FINGER HELD OPEN
BY WRENCH, READY TO RECEIVE PADS



MASTER FINGER WITH PADS INSERTED

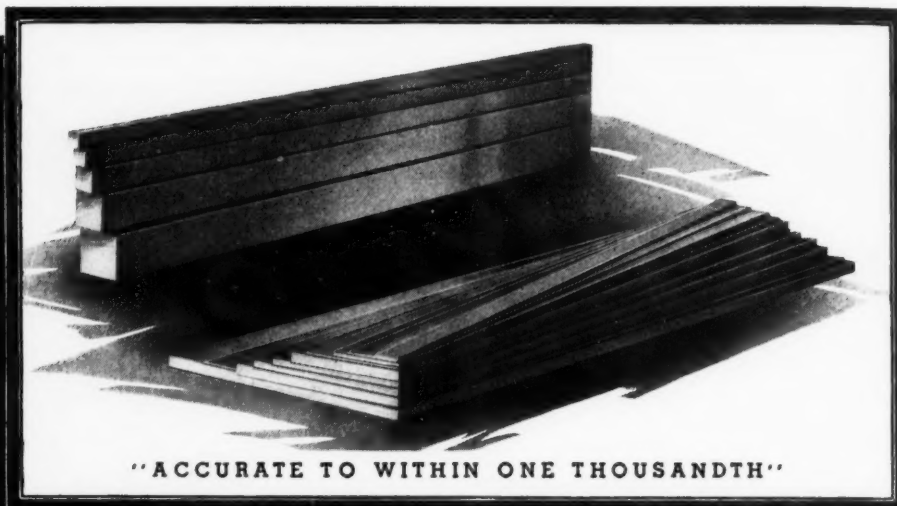
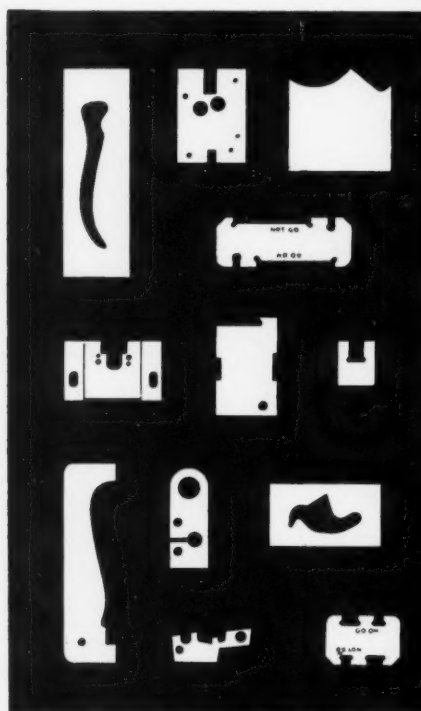
*Provides for
maximum wear
life and stock
protection*

Ask for circular listing sizes and
prices. Brown & Sharpe Mfg.
Co., Providence, R. I., U. S. A.



SAVE TIME • SAVE TROUBLE • SAVE MONEY

with **STARRETT**
GROUND FLAT STOCK



for

TEST TOOLS
DIE WORK
JIG PARTS
FIXTURES

PARALLELS
MACHINE PARTS
SHIMS
PUNCH DIES

TEST GAUGES
SNAP GAUGES
TEMPLATES
CUTTERS

How many hours do your men waste hunting up stock and grinding it to size for these special tools and parts? Plug this source of waste by keeping a supply of Starrett Ground Flat Stock in the tool-crib. Made of first quality tool steel, cut lengthwise from the sheet, ground to within .001" of size and annealed for easy machining. Starrett Ground Flat Stock No. 495 comes in 18-inch lengths in a complete range of widths and thicknesses. Revised Starrett Catalog No. 25 D lists all sizes and prices. Write for your copy.

THE L. S. STARRETT CO., ATHOL, MASS., U.S.A.

*World's Greatest Toolmakers—Manufacturers of Hacksaws Unexcelled—Steel Tapes, Standard for Accuracy
Dial Indicators for Every Requirement*

Standardize on

STARRETT TOOLS
BUY THROUGH YOUR DISTRIBUTOR



Immediate Steel

There is hardly a product in the steel and allied lines that you cannot secure quickly and economically from the nearest Ryerson plant. Stocks that include more than 10,000 sizes and kinds of steel and allied products . . . modern handling and cutting facilities . . . and special dispatching methods, assure accuracy, dependability and speed. When you need steel, call on Ryerson. Ten plants stand ready to meet your requirements.

Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

RYERSON STEEL-SERVICE



Increasing the life of forging dies

DIE renewal is always a factor in the production cost of forged parts. And when actual instances appear showing die expense being slashed and not just shaved, the subject becomes one of major importance.

Our records hold a recent case example in which die blocks from a former material lasted only a week

to ten days. Blocks containing .20-.30 carbon, 3.5 nickel and .35 Moly lasted three months.

Since Moly greatly increases steel's resistance to sudden heat impact, it quite naturally adds to the life of forging dies and thus substantially cuts down production costs.

Our technical book, "Molybdenum," will prove useful to engineers and production heads interested in cost cutting and product improvement. Our monthly news-sheet, "The Moly Matrix," keeps its readers informed on Moly developments. Both sent free on request. Our laboratory is available for the study of special ferrous problems. Climax Molybdenum Co., 500 Fifth Ave., New York.

PRODUCERS OF FERRO-MOLYBDENUM, CALCIUM MOLYBDATE AND MOLYBDENUM TRIOXIDE

Climax Mo-lyb-den-um Company
MOLY

ROLLED STEEL CONSTRUCTION ... *Every one!*

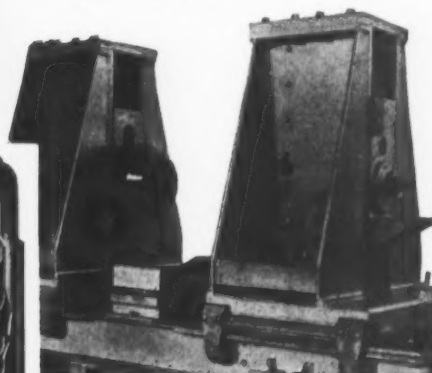
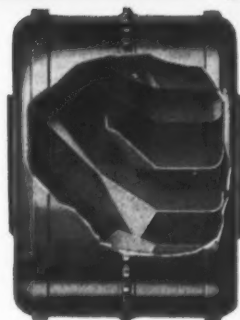
*And that means the right steel in the
right place to do a more efficient job*



(Above) 30 cubic yards at one gulp. USS MAN-TEN rolled steel welded in this heavy duty dipper saves thousands of pounds of weight that are converted into increased dipper capacity.

(Left) USS Stainless Steel, because it should last indefinitely and will not contaminate most corrosive products, is often the best choice for welded chemical machinery like this power-agitated autoclave.

(Right) Abrasion-Resisting Steel in this concrete mixing drum withstands destructive pound and grind. Reduces breakage. Ensures long life.

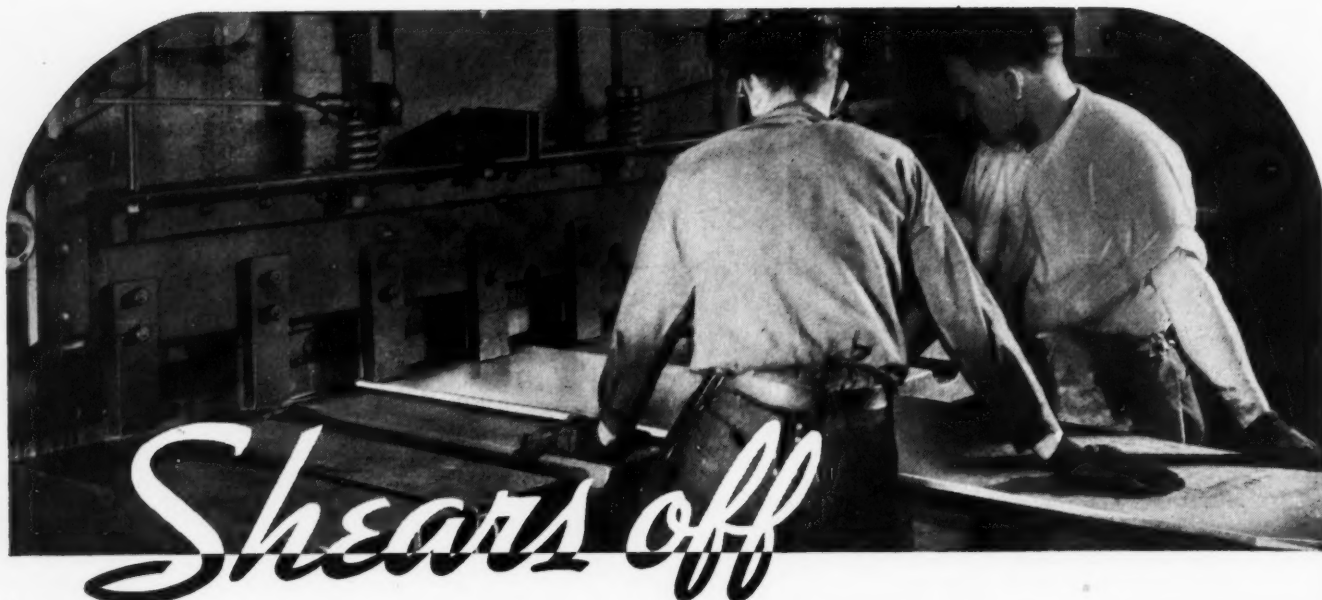


Welded rolled steel and steel castings ideally combined in this cone-type uncoiler for tin plate mill, make this unit strong, light, rigid—eminently practical and economical.



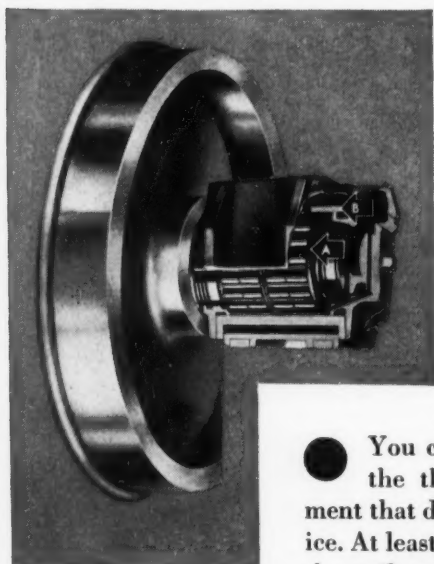
AMERICAN STEEL & WIRE COMPANY, *Cleveland*
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
NATIONAL TUBE COMPANY, *Pittsburgh*
TENNESSEE COAL, IRON and RAILROAD COMPANY, *Birmingham*
United States Steel Products Company, *New York, Export Distributors*

UNITED STATES STEEL



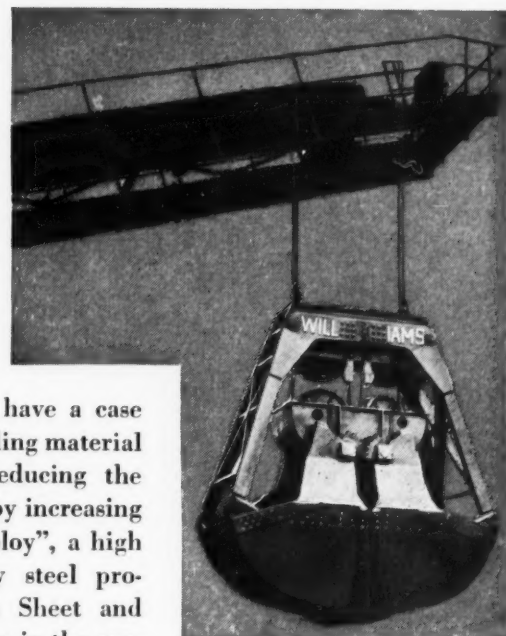
Shears off NEEDLESS COSTS *and* NEEDLESS WEIGHT

● The trouble with costs is you can't tell how much is *needless* until there's a basis for comparison. But here's one that ought to be interesting to every user of tool steels. The shear blade pictured above operating on hard alloy steel stock was formerly made of carbon tool steel. After cutting 200 to 500 pieces, however, the blades regularly became spalled or broke out at the edges. But after the Henry Disston Steel Works furnished blades made of their "827" medium carbon Nickel-chromium steel, the average service life jumped to 3,000 to 6,000 cuts between grinds with no spalling or breakage. Nickel steel not only sheared more parts but sheared off needless cost.



● You can't help but have respect for the thrift of transportation equipment that delivers a *million miles* of service. At least that much mileage is given by the railroad coach journal bearing pictured at the left, a type that is used by 24 leading railway lines and manufactured by The Fafnir Bear-

● Here at the right we have a case where the cost of handling material was appreciably cut by reducing the weight of equipment, thereby increasing the pay load. By using "Yoloy", a high tensile Nickel-copper alloy steel produced by the Youngstown Sheet and Tube Co., Youngstown, Ohio, in the construction of this large breakdown coal bucket, its pay load capacity was increased from 6 to 7 tons without increasing its gross weight.



NICKEL ALLOY STEELS

ing Co., New Britain, Conn. Among the reasons are the inner race (A) made of shock-resisting Nickel-molybdenum carburizing steel and the housing bore (B) made of wear-resisting Nickel Cast Iron.

We invite consultation on the many ways in which the Nickel Alloy Steels will help to reduce operating and maintenance costs.

THE INTERNATIONAL NICKEL COMPANY, INC., NEW YORK, N. Y.

- ✓ IMPROVED MACHINABILITY
- ✓ SUPERIOR FINISH . . .
- ✓ REDUCED WASTE . . .

*You get
them all!*

WHEN you use Cold Finished Steel Bars in producing machined parts, you get all of these money saving advantages. Parts machined from Cold Finished Steel Bars can be made with great accuracy with a minimum of machining operations, and when completed have that smooth, shining finish which otherwise can be obtained only with additional work.

Amercut Cold Finished Steel Bars will give you the quality and uniformity characteristic of products manufactured by the American Steel & Wire Company. The cold drawing operation employed in making these bars improves the physical properties of the steel and gives it a smooth finish and accurate size. For this reason there is no need for turning down the bar to remove surface imperfections, and considerable savings can be made in scrap and turnings as well as in time. For more than half a century these bars have been producing the finest results wherever they have been used.

Amercut Cold Finished Steel Bars are kind to your tools. Uniformity and freedom from imperfections not only improve their machinability but lengthen tool life.

Amercut Cold Finished Steel Bars are available in any type or grade you need and can be produced in the exact analysis and finish you require. We will be glad to furnish you with technical assistance at any time.

We are equipped to furnish Amercut Cold Finished Steel Bars in any size rounds from 1/32" diameter up to and including 6". We also produce a wide range of sizes and shapes of bars to supply every need. We suggest that you consult our Sales Department or Service Engineers for requirements that are other than standard.

U·S·S AMERCUT COLD FINISHED STEEL BARS

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York



Columbia Steel Company, San Francisco, Pacific Coast Distributors • United States Steel Products Company, New York, Export Distributors

UNITED STATES STEEL

WANT



IMMEDIATE SERVICE ON QUALITY STEEL SHAFTS?

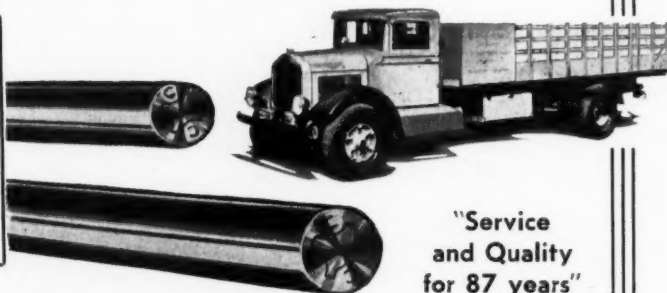
PICK UP YOUR PHONE

**Your order is soon
on its way to you
filled promptly from ample stocks!**

Steel Shafts so accurate—so true and straight and concentric that there's never a need to file or fit, can be loaded on a truck and whisked away to you almost before the ink is dry on your order. A telephone call to the nearest strategically located CUMBERLAND distributor gets you quick action—and delivers to your door the finest quality shafts any money can buy.

Try it! Of the three Cumberland brands, there is one to meet exactly your requirements.

TOLERANCES	
SPECIAL	
(Any Diameter)	
LIMITS $\pm 0.0005''$	
or any other total tolerance of 0.001''	
STANDARD	
Small Dia.	$\begin{cases} +0.000'' \\ -0.002'' \end{cases}$
Large Dia.	$\begin{cases} +0.000'' \\ -0.003'' \end{cases}$



"Service
and Quality
for 87 years"

CALL YOUR CUMBERLAND
DISTRIBUTOR IN THE
NEAREST OF THESE CITIES:

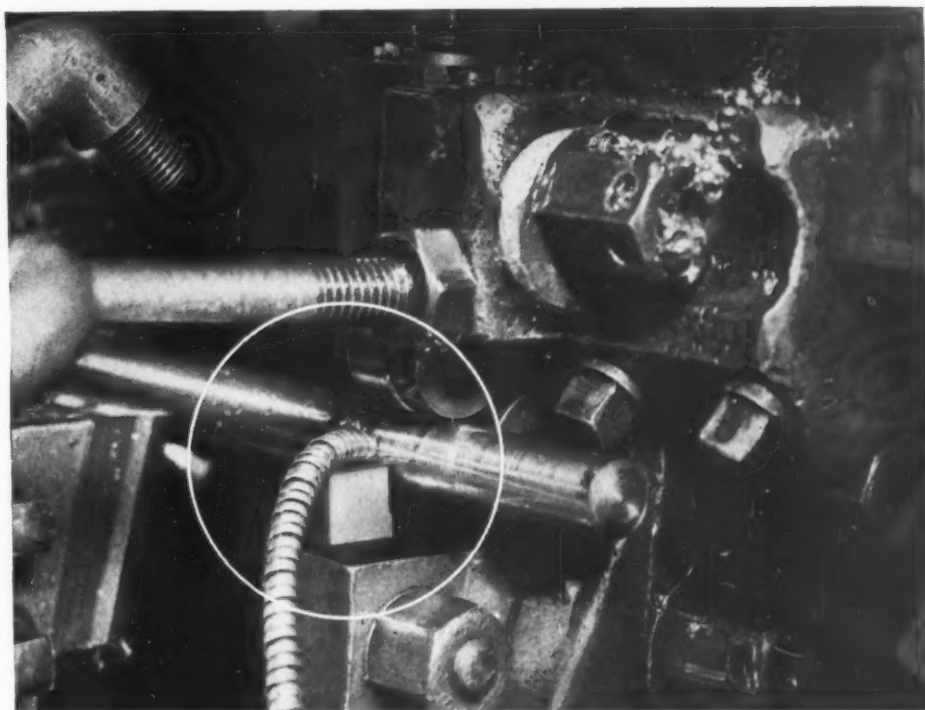
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CHICAGO, ILL.
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CUMBERLAND STEEL SHAFTS

PRODUCT OF CUMBERLAND STEEL CO., CUMBERLAND, MD.

Haynes Stellite J-METAL machines more pieces per grind

Turning a heat-treated nitralloy water pump shaft (235 to 269 Brinell) from 13/16 to 5/8 inch at 320 R.P.M. with Haynes Stellite J-Metal. Surface speed—70 ft. per min.; feed—0.0078 in. per rev.; depth of cut—3/32 in.



• Eighty pieces are machined per grind with a Haynes Stellite J-Metal solid tool bit on this automotive production job. Other tools averaged only ten to twenty pieces per grind on the same job . . . Haynes Stellite J-Metal cuts faster and wears longer than other tools because it is tough and abrasion-resistant even at red heat and because it has a low coefficient of friction. Increased production and lower tool and manufacturing costs result.

Forty-three other actual production jobs are pictured and described in "Haynes Stellite J-Metal Cutting Tools", a new 56-page operating manual on all phases of machining with Haynes Stellite J-Metal. This valuable reference book will tell you how, when and where you can use Haynes Stellite J-Metal profitably. You may have a copy by asking for it. Write or phone the nearest Haynes Stellite office today.



A red-hot, wear-resisting alloy of Cobalt, Chromium and Tungsten

HAYNES STELLITE COMPANY

Unit of Union Carbide and Carbon Corporation



Chicago • Cleveland • Detroit • Houston • Los Angeles • New York • San Francisco • Tulsa

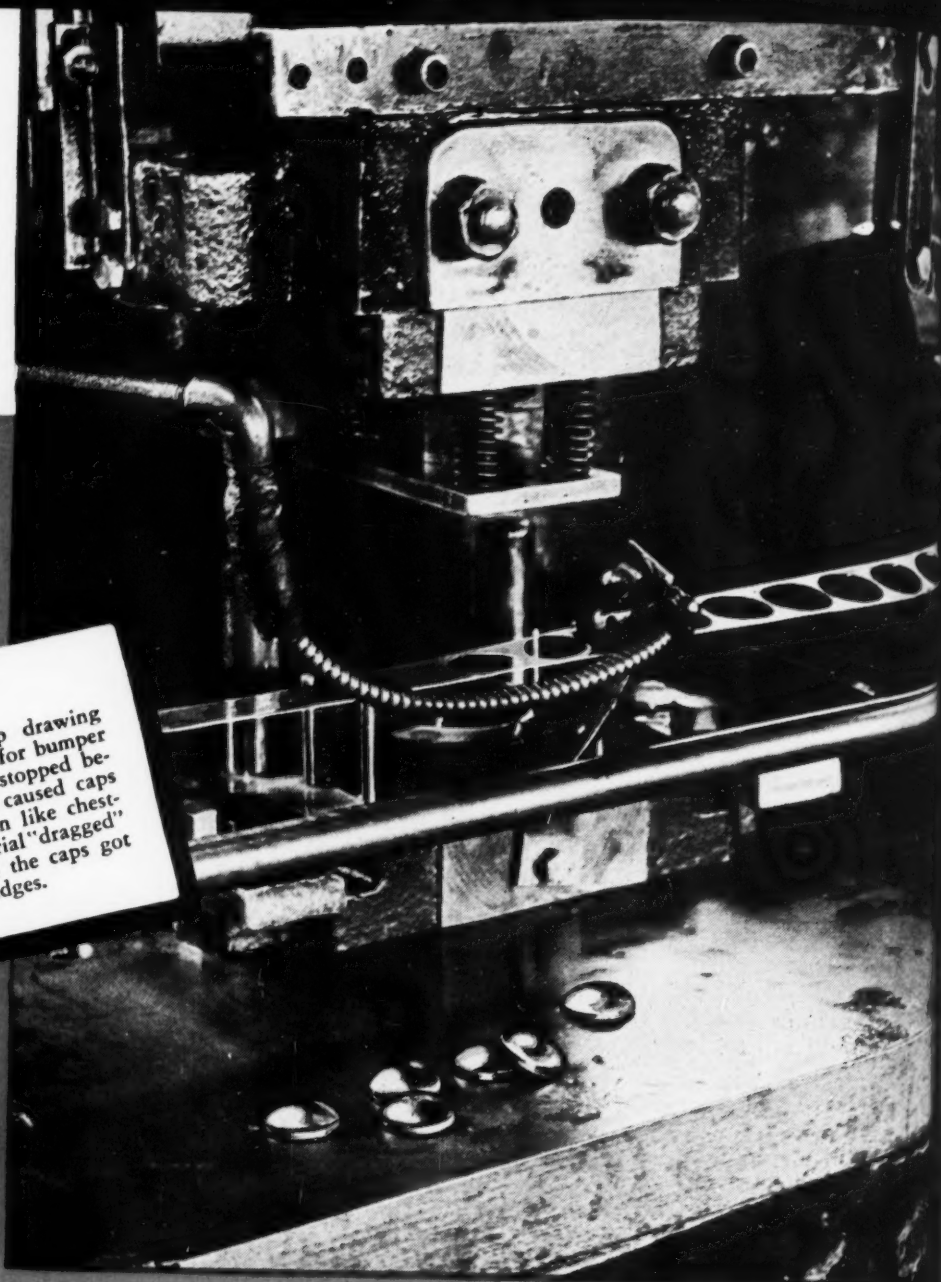
General Office and Works—Kokomo, Indiana

Foreign Sales Department—New York City

Haynes Stellite Welding Rods and information on other Haynes Stellite Products also are available through the 46 apparatus shipping points of The Linde Air Products Company

THE JOB

Punching and deep drawing Stainless Steel caps for bumper bolts. Production stopped because some steels caused caps to split wide open like chest-nuts—or the material "dragged" in the press and the caps got rough, ragged edges.



THE RESULT

Carpenter Stainless No. 6 solved the problem and ended the splitting of caps. Edges are smooth and the caps come out of the press with a fine, money-saving finish at a speed of 45 per minute. By choosing the right grade of Carpenter Stainless, you can often prevent production delays and get lower Stainless costs.

more than corrosion resistance



Carpenter

... "and then we tried **CARPENTER STAINLESS!"**

Surprising how many production men have told us lately about Stainless Steel jobs that had them completely stumped . . . "and then we tried Carpenter Stainless", they conclude.

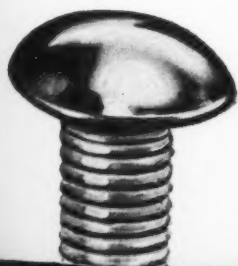
There's something about the ring of satisfaction in a man's voice when he says it, that leaves no doubt about the result. Of course, we don't score a home run every time, but from what the men in the shop tell us, our batting average stays consistently high.

There are still some men who feel that all Stainless Steels are alike. Difficult jobs like the one shown, demonstrate that there *is* a difference—and that some Stainless Steels

are easier to fabricate than others.

You may have run into the sort of trouble that occurred on the punch and deep draw job pictured. It was solved by Carpenter Stainless No. 6. There is a grade of Carpenter Stainless Steel to meet every requirement—and Carpenter representatives are equipped by knowledge and experience to cooperate with you in overcoming trouble.

Would you like a copy of a book that will give you a lot of valuable information on fabricating Stainless Steel? Write for a copy of "Working Data and Technical Facts on Stainless Steels"—sent free in the U. S. A.



The Carpenter Steel Co.
READING, PENNA.

Licensee of Chemical Foundation, Inc.

Page 41

STAINLESS

STEELS

VascoLOY-Ramet is available in three forms: (a) completely finished tools, (b) milled and brazed tools, and (c) blanks. V-R blanks are furnished in 5 standard styles and in sizes to meet every requirement. To make tools with V-R blanks is a simple operation, fully described in a new instruction booklet, sent free—upon request.

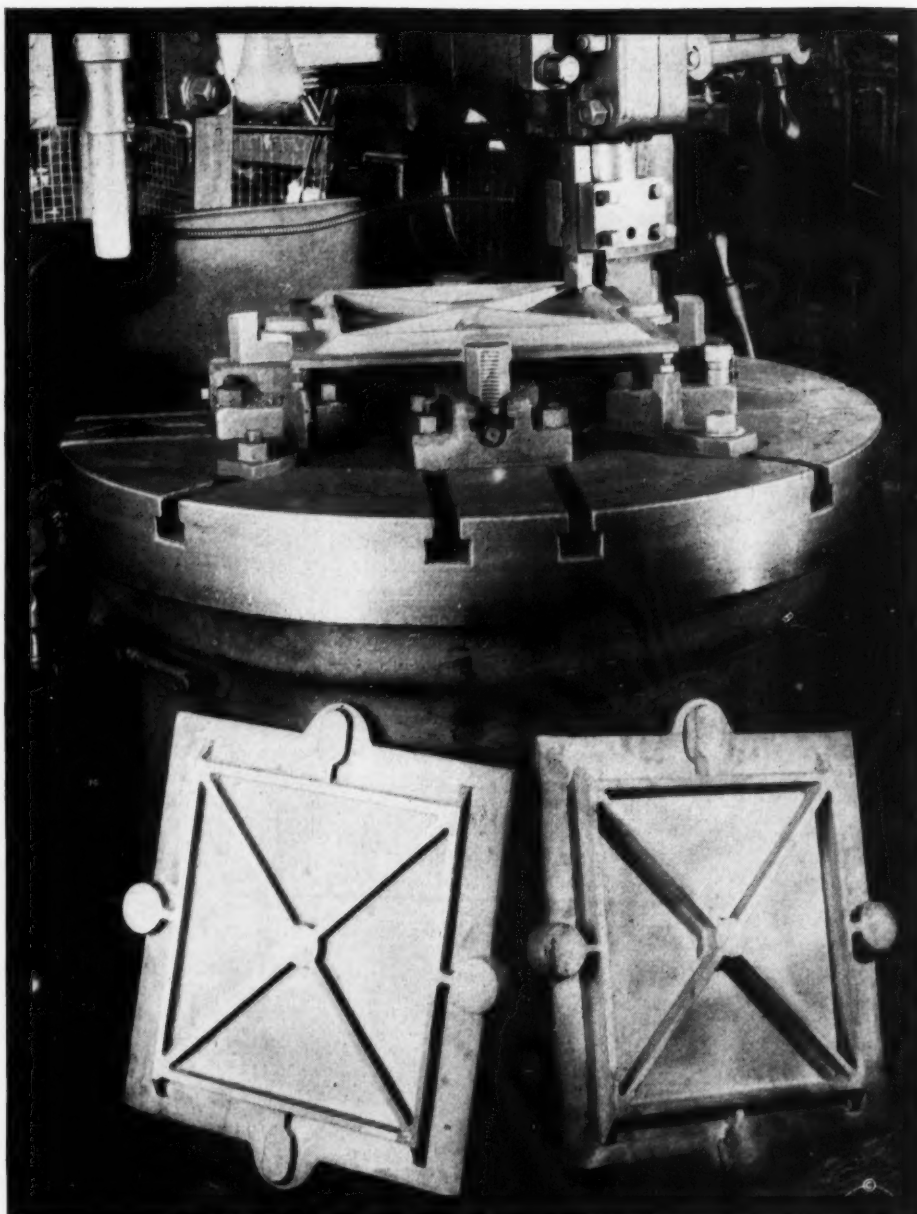
Cast iron and cast iron alloys, semi-steel, brass, bronze, aluminum and aluminum alloys, non-ferrous metals and materials, all steels from the softest to the hardest and toughest alloys—whatever the material there's a V-R grade which precisely fits the job.

Produced in 17 standard grades, of different tantalum-carbide content, strength and hardness, it alone covers the entire range of machinable materials with "a grade for every use."

That is why VascoLOY-Ramet is setting new records daily for increased pieces per grind, for faster time from floor to floor, for lowered production costs.

This is the reason for its rapidly increasing acceptance as the preferred tool material, in great industrial plants and in small shops, as well, throughout the country.

The new V-R catalog price-list will be sent upon request.



Intermittent cutting, core plate 18" x 20", ribbed on one side, flat on the other. Material: Cast iron. Tool used: V-R, grade A, 1 1/4" square; style 6, ground 6° clearance, flat top; 1/16" radius on nose. Two core plates are shown in the lower foreground, at the right—un-machined; at the left—finish machined.

TOOL USED	FEED	DEPTH	R.P.M.	SPEED	PIECES PER GRIND
VascoLOY-Ramet Grade A	.025"	1/16" to 1/8"	60	130 FPM Maximum	25 (Both sides)

VANADIUM-ALLOYS STEEL CO.
VASCOLOY-RAMET DIVISION, NORTH CHICAGO, ILL.

VASCOLOY-RAMET

... The TANTALUM CARBIDE TOOL MATERIAL ...



A GRADE FOR EVERY USE

42—MACHINERY, August, 1937

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Better Form and Finish

DUE TO BAKELITE MOLDED

IN ANY PRODUCT or device for home use today, design and styling are important to successful sales. For many products of this kind, Bakelite Molded affords the manufacturer a ready means of providing advanced designs at practical production costs.

A typical illustration is the Vent Axia air purifier, with entire case

and rotor fan of Bakelite Molded. Through use of this material, simple compact design with ready accessibility of parts, was made possible. Also, a permanent lustre and rich self-contained color were obtained on all surfaces.

In production, each Bakelite Molded part is completed in a single press operation, with all necessary



Vent Axia air purifier with case and mechanical parts of brown Bakelite Molded.



grooves, threads, bosses and through-holes, and with metal inserts firmly and accurately imbedded. The surface lustre is imparted in the same operation, obviating separate finishing schedules.

Further important advantages of Bakelite Molded for the manufacture of an almost unlimited variety of products are its valuable electrical properties, mechanical strength and high resistance to moisture, oil, heat, fumes and common chemicals.

Manufacturers and designers are invited to consult us regarding advantageous types of Bakelite Molded for specific applications. Also write for our booklet 30M "Bakelite Molded".

(Left) Large and small parts of the Vent Axia purifier — each completed in a single press operation.

BAKELITE CORPORATION, 247 PARK AVENUE, NEW YORK, N.Y.
BAKELITE CORPORATION OF CANADA, LIMITED, 163 Dufferin Street, Toronto, Ontario, Canada

BAKELITE



"The registered trade marks shown above distinguish materials manufactured by Bakelite Corporation. Under the sign 'B' is the numerical sign for efficiency, or unlimited quantity. It reproduces the symbol member of present and future use of Bakelite Corporation's products."

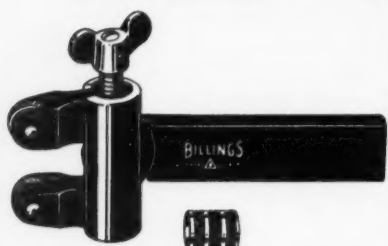
THE MATERIAL OF A THOUSAND USES

MACHINERY, August, 1937—43

COMMERCIAL DROP FORGINGS · BOARD DROP HAMMERS and DIE MAKING MACHINERY

BILLINGS

THE BILLINGS & SPENCER CO. HARTFORD, CONNECTICUT, U. S. A.



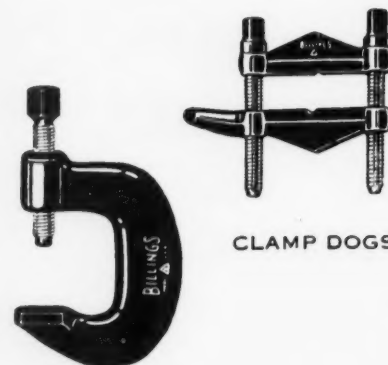
LATHE KNURLING TOOLS



DIE AND TOOL MAKER'S HAMMERS



ALL STEEL MACHINISTS SCREW DRIVERS

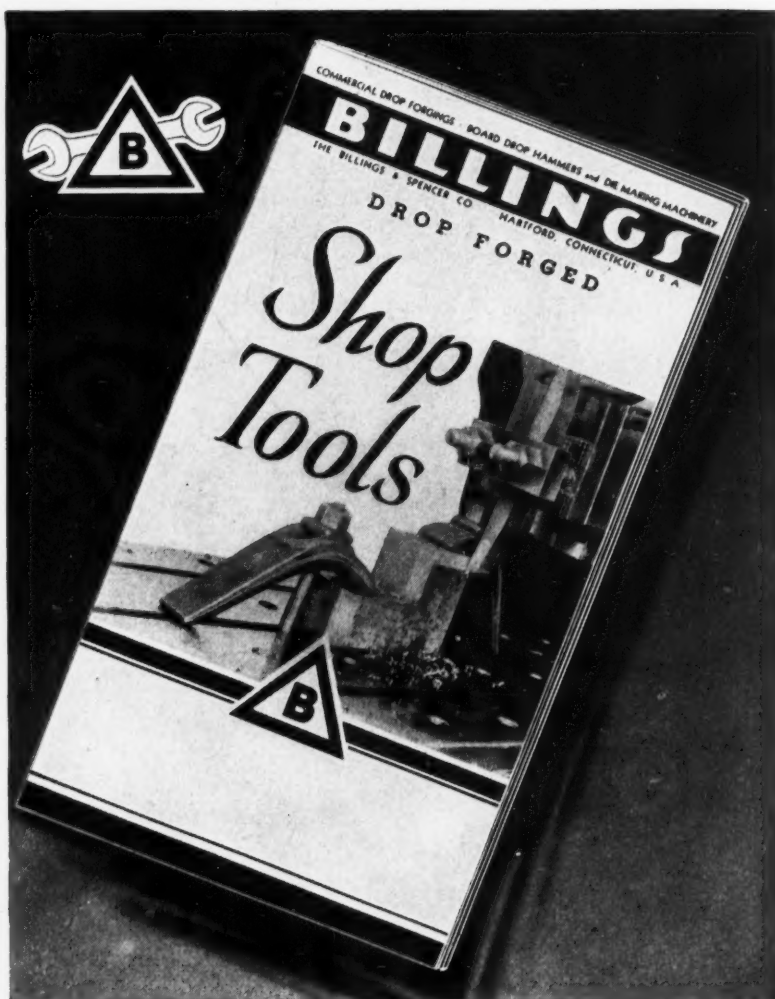


CLAMP DOGS

"C" CLAMPS



LATHE DOGS



With the "BILLINGS" Guarantee

"Hey fella, that's a BILLINGS and I want it back"

The owners of BILLINGS "Duo-Forged" Shop Tools gladly lend but insist upon them being returned. They know their Wrench and Tool investment means a "Life-Time" of service because it's backed by the BILLINGS Guarantee. Ask any mechanic—he knows.

"SHOP TOOL" Booklet—

illustrates these popular Tools mechanics have used for years—you'll want a copy, WRITE Dept. L.

FORGED TOOLS

COMMERCIAL DROP FORGINGS · BOARD DROP HAMMERS and DIE MAKING MACHINERY

SMALL DIAMETER FINE PITCH THREADS



» Geometric Style EJ4 meets the demand for a very light, removable chaser Die Head for cutting threads from 1/16" to 1/4" in pitches 20 or finer. Made either with the conventional plain shank, or with threaded back part for No. 00G Brown & Sharpe and similar threading machines, it has these outstanding features: «

The four chasers can be easily adjusted to cut within very close tolerances.

Weight three ounces.

Advances freely.

Made of special alloy steel, hardened and ground.

Chasers easily removable for re-sharpening, or for changing to other sizes.

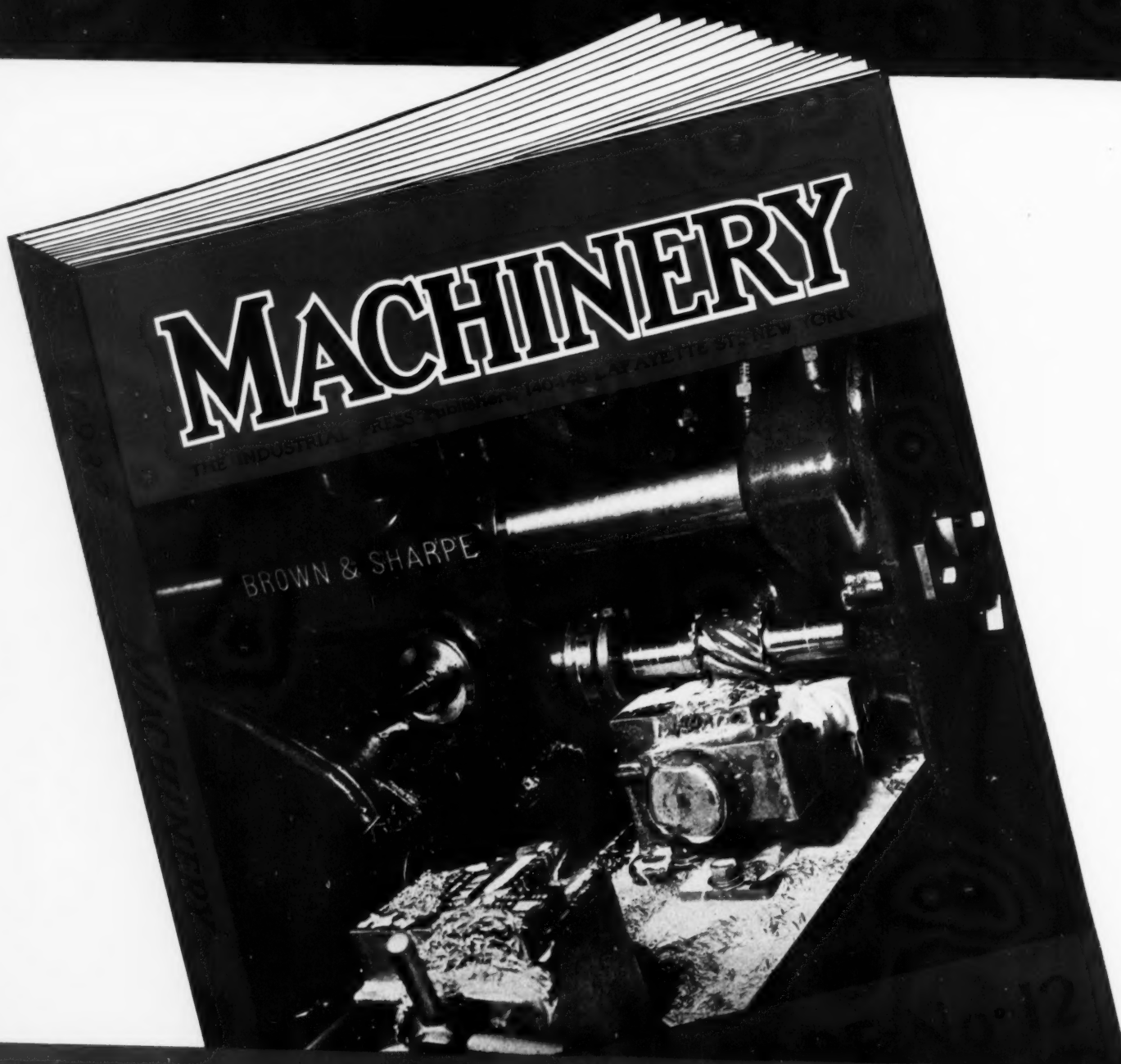
Die Head can be used for both Right Hand and Left Hand cutting.

Each set of chasers given a cutting test and checked carefully for thread form, lead and taper.

Running at 7000 R.P.M., with the work spindle running at 5000 R.P.M., the EJ4 produced brass screws at the rate of 60 per minute—a convincing test of its ruggedness and capability. The first cost of the EJ4 is small. The price of chasers is less per set than most solid dies. You save money and produce better work by replacing your often inaccurate solid dies with EJ4's. Send for our Bulletin giving complete information.

THE GEOMETRIC TOOL CO. NEW HAVEN
CONN., U.S.A.

USERS—MANUFACTURERS METAL



ANNUAL CUTTING

A LASTING RECORD OF ACCOMPLISHMENT IN THE "ART OF CUTTING METALS"

With hundreds of shops, large and small, each working out its own production problems in accordance with modern conditions, there is bound to be much progress made each year in ways and means of cutting metal . . . The purpose of MACHINERY'S Annual Cutting Tools Number is to record this progress graphically; to gather together available data from reliable sources and put it in a form which will be usable and valuable to the mechanical industries at large.

**OCTOBER
MACHINERY
TOOLS NUMBER**



NOT ACCURATE ENOUGH!

Bow and arrow methods won't do today! Modern marksmen choose the high speed rifle for the utmost in accuracy . . . just as production men are choosing the *So-swing* IMP with its lightning speed, brilliant finishes and sensational accuracy. If you want the economy of faster production with fewer rejects, get the facts on the *So-swing* IMP.

Maybe the So-swing people at
SENECA FALLS
can reduce your turning costs

WRITE SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

BOSTON

offers

six different types of
RATIOMOTORS

1 - HORIZONTAL TYPE

2 - VERTICAL TYPE

3 - INVERTED TYPE

4 - HORIZONTAL TYPE 1/20th horsepower

5 - HORIZONTAL COMPOUND TYPE

6 - VERTICAL COMPOUND TYPE

Boston Ratiomotors are equipped as standard with General Electric or Westinghouse motors.

BOSTON GEAR WORKS, Inc.

NORTH QUINCY, MASS., U. S. A.

1

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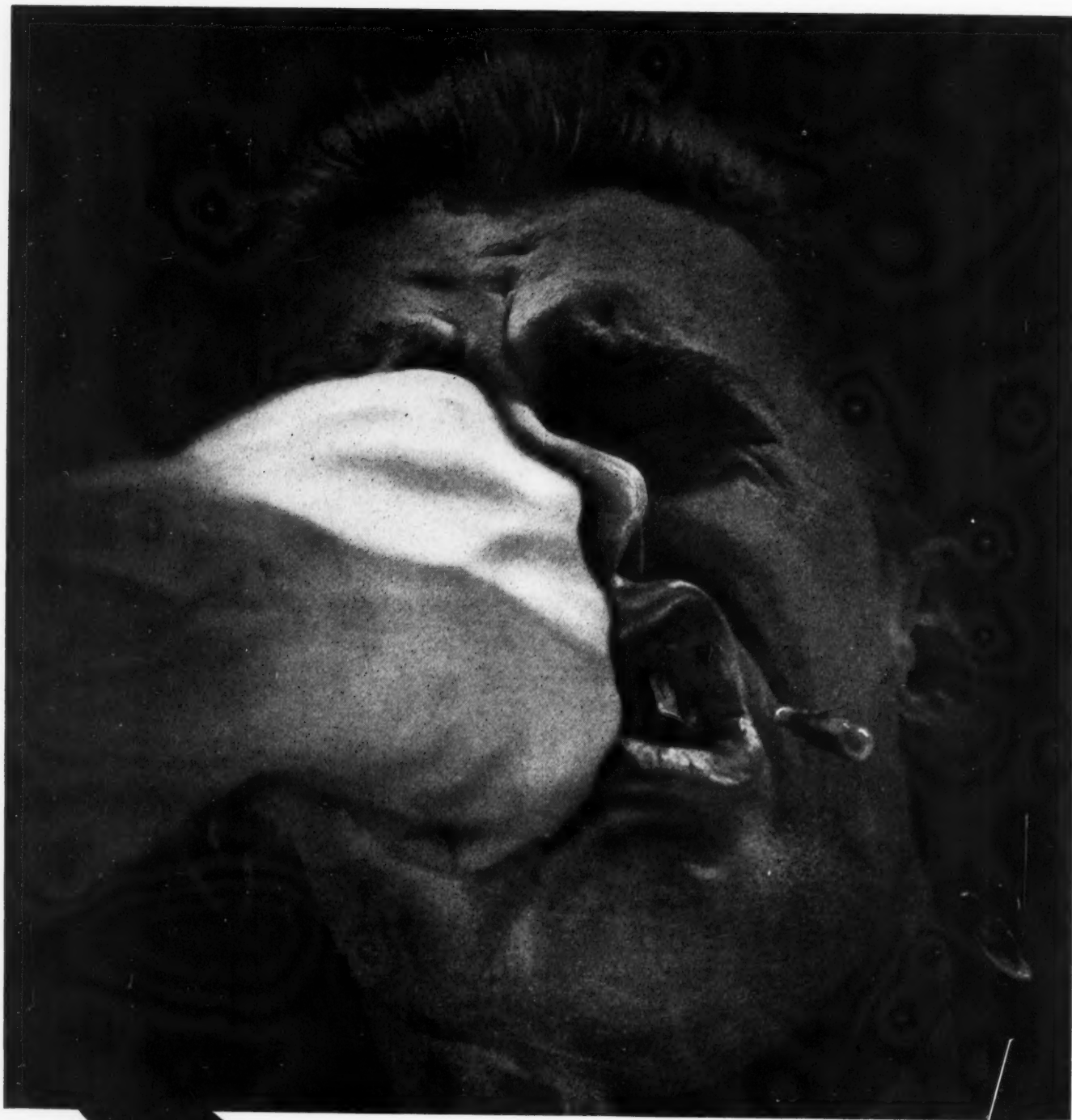
3

5

6

4

SEND FOR DESCRIPTIVE CATALOG



SOCK!

Right on the nose!

Away go the teeth!

The same thing happens to your lathe if its spindle nose is threaded

You have to lock the gears against each other and then sock the face plate to loosen the threads. You might just as well use a steel hammer on the gear teeth. What good then is the fine accuracy of those ground spindle gear teeth? One sock and away it goes. Sock often enough—as you must—and the lathe becomes noisy and puts gear marks on the work. You won't actually knock out any teeth, but you certainly will destroy the precision the manufacturer put there. It is happening in your lathe if it has a threaded spindle nose.



It can't happen with the PRATT & WHITNEY Cam-Lock Spindle Nose

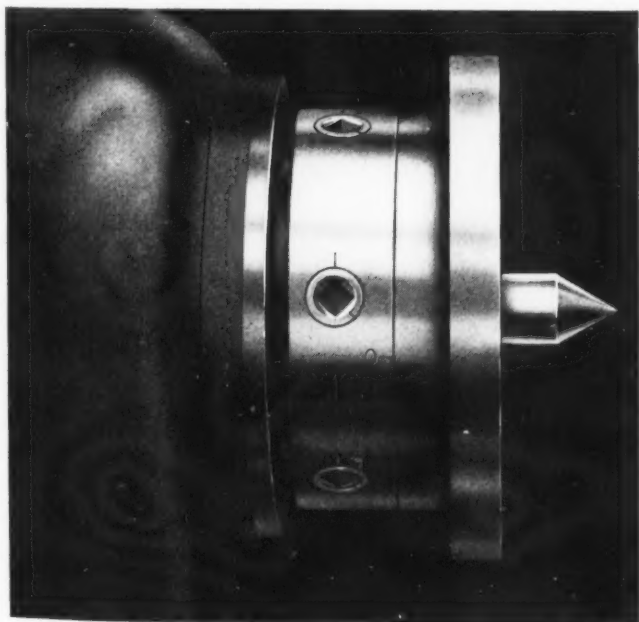


There are no spindle threads. Cams working against six notched studs lock the face plate or chuck solidly in position. These cams are tightened or loosened with a wrench—hand tight only. There is no possibility of spoiling gear tooth accuracy because no blow is

needed. It is easier to mount or unmount a chuck on the Cam-Lock Spindle Nose than on any other known type.

This new spindle nose has the advantage of tremendous rigidity in holding the face plate or chuck on the spindle, with no chance of a throw-off if the spindle is stopped suddenly. It is permanently accurate in holding the chuck central and square.

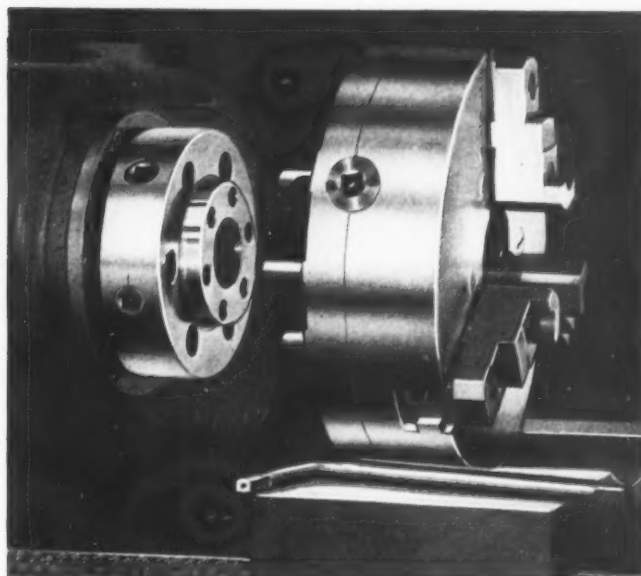
The Cam-Lock Spindle Nose is standard on all Pratt & Whitney Lathes. Find out about it. We will send complete information to any interested executive.



Pratt & Whitney

DIVISION NILES-BEMENT-POND CO.

HARTFORD, CONN.





For all INDUSTRIES *and all* PRODUCTS

If you use ball bearings in your product, your plant, or your machines . . . there is a "Commercial" ANNULAR BALL BEARING exactly suited to your needs including all standard sizes. If you have an unusual or different installation, we make bearings to your own specifications.

In other words "Commercial" ANNULAR BALL BEARINGS have a wide range of use—from roller skates to locomotives: From customary standard types and sizes to the most complicated location. "Commercial" ANNULAR BALL BEARINGS are precision bearings, quality bearings designed and built to withstand overloads, side-thrusts and speeds up to 2500 R.P.M.

The cost of "Commercial" ANNULAR BALL BEARINGS is astonishingly moderate—a feature which appeals to manufacturers who seek to cut costs in these days of rising prices. In addition to all these advantages, we offer the services of our Engineering Staff—ready to help solve your bearing problems. Get details and prices of "Commercial" ANNULAR BALL BEARINGS.


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Ex-Cell-O Equipment for Multiple Operations



The economies of grouping a number of operations on one machine in a single set-up are no longer limited to jobs which are big enough in themselves to pay for a special machine.

Ex-Cell-O Hydraulic Power Units in combination with Ex-Cell-O standardized machine tool units including bases, multiple heads, vertical columns, etc. enable you to obtain a special machine at minimum cost. Often, only the fixtures need to be built for the specific job.

Such assembled machines are readily adapted to model changes; the standardized parts may be reassembled into an unlimited number of combinations for future use.

Complete information will be furnished gladly upon request.



TRADE MARK

EX - CELL - O CORPORATION • DETROIT, MICHIGAN

ARMSTRONG



Machine tools seldom wear out—you're racing Obsolescence!

Few machine tools ever wear out. They are obsoleted by newer developments—are replaced while still in good running order by later, more efficient equipment. The "junking" of good machine tools before they have delivered their full capacity is a waste that in many cases can be prevented by the use of ARMSTRONG TOOL HOLDERS.

With ARMSTRONG TOOL HOLDERS you can step up speeds and feeds—can get more from every machine hour, from every lathe, planer, slotter,



ARMSTRONG TOOL HOLDERS Are Used in Over 96% of the Machine Shops and Tool Rooms

and shaper. Drop forged from special steels, stronger and absolutely dependable, ARMSTRONG TOOL HOLDERS will stand up indefinitely at speeds far above the customary 150 f.p.m. established in the day of forged bar tools.

You can build your Armstrong System Tool Holder by Tool Holder, from the stocks of your nearest Mill Supply House. You can make the change over the haphazard tooling methods to dependable ARMSTRONG TOOL HOLDERS without disrupting production or special appropriation. Then you can step up the hourly production, cut cutting cost, increase output and get more useful life from every machine tool. Write for a B-35 Catalog today . . . and order as needed by number.

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

313 N. Francisco Ave., CHICAGO, U. S. A.

Eastern Warehouse and Sales: 199 Lafayette St., New York, N. Y.
San Francisco London



WHETHER you assemble bridges or bridge tables—there's a new Van Dorn Nut Runner, Electric Wrench or Screw Driver that will cut your costs and speed your production. Models are available to drive nuts, screws and bolts of every size, from the smallest screws used in electrical apparatus assembly up to nuts and bolts $\frac{7}{8}$ " in diameter. Why not list your assembly operations now being done by hand—and ask your Jobber for a demonstration of Van Dorn Tools that will save you money on these operations. Or write for a new Van Dorn catalog today. The Van Dorn Electric Tool Co., 735 Joppa Road, Towson, Maryland.
(Div. of The Black & Decker Mfg. Co.)

FOR POWER, SPECIFY



"Van Dorn"

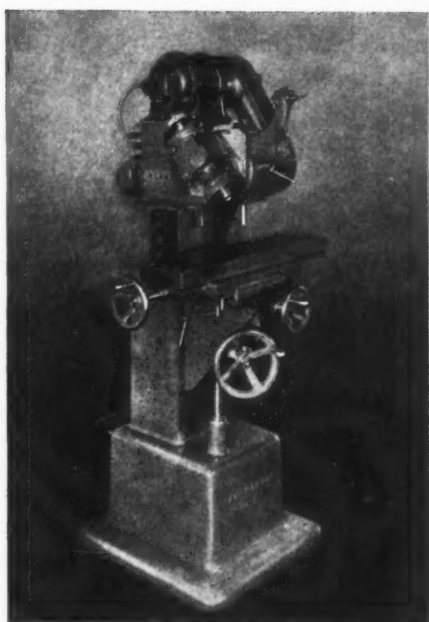
PORTABLE ELECTRIC TOOLS

MACHINERY, August, 1937—55

S

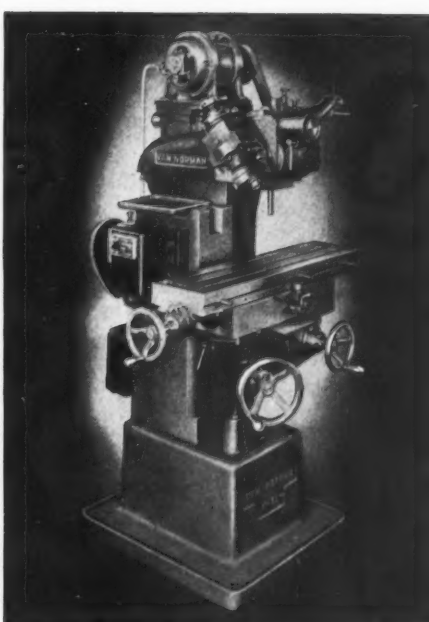
wing the cutterhead . . . slide the ram . . . and let the set-up stand. That's all you have to do to finish 9 out of 10 milling jobs on a Van Norman Universal Miller. It's just like having several milling machines with a common table. For without shifting the set-up, you can do vertical, horizontal, angular milling,—both sides of the job if necessary. Mill compound angles. Cut spirals. Bore, counterbore, face. Drill, slot, rout

VAN NORMAN
SPRINGFIELD . .



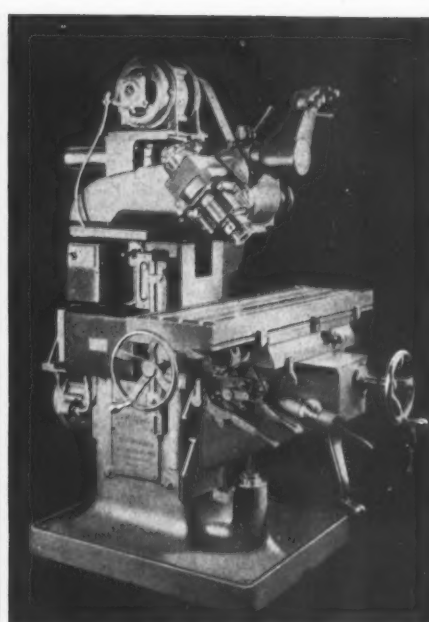
NUMBER 6

Table Size	30x6 $\frac{7}{8}$ "
Feed Range	18x5 $\frac{3}{4}$ x6 $\frac{1}{4}$ "
Ram Movement	9 $\frac{1}{2}$ "



NUMBER 12

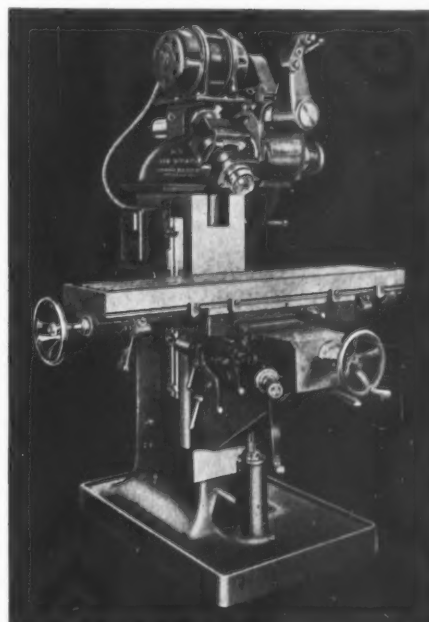
Table Size	37x8 $\frac{1}{8}$ "
Feed Range	17x6 $\frac{5}{8}$ x17"
Ram Movement	10"



NUMBER 22

Table Size	45x11 $\frac{5}{8}$ "
Feed Range	27 $\frac{1}{2}$ x11x17 $\frac{1}{2}$ "
Ram Movement	19"

at high speeds. All of which means that you can cut floor to floor time as much as 50%—and quote on new work accordingly. In addition, you rid your shop of the bugbear of delay and error caused by tricky blocking, resetting, and changing the work to other machines. Interested? Write now.



NUMBER 32

Table Size	55x12"
Feed Range	34x10 $\frac{1}{8}$ x22 $\frac{1}{4}$ "
Ram Movement	19"

MACHINE TOOL CO.

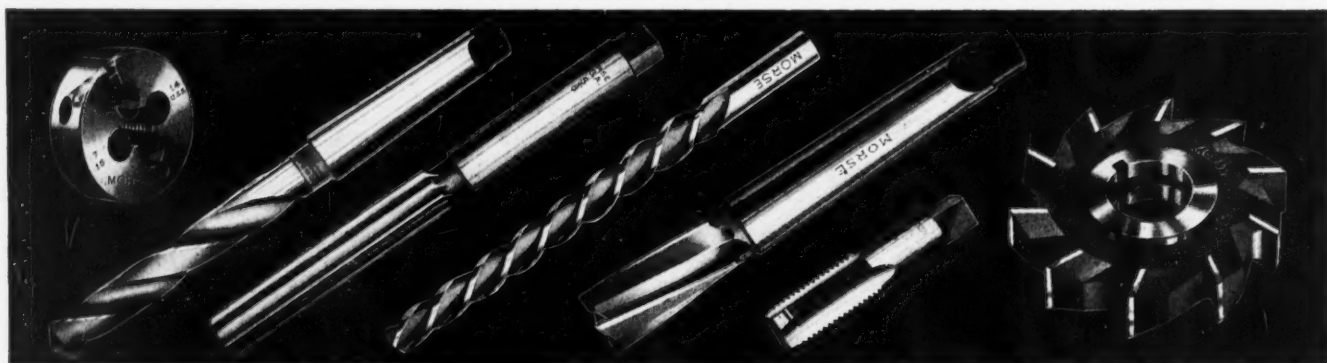
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THE MORSE LINE INCLUDES HIGH SPEED AND CARBON DRILLS - REAMERS - CUTTERS - TAPS and DIES - SCREW PLATES - ARBORS - CHUCKS - COUNTERBORES - MANDRELS - TAPER PINS - SOCKETS - SLEEVES



No matter what your needs, your Morse distributor can meet them from the wide Morse line. And because every Morse Tool must pass high standards, it pays to rely for every tool on this name that is a byword in the shops of the world.

When you write "Morse" on the order form, you specify tools that are inspected at every step of their manufacture; — tools whose excellence is the result of years of tool-making experience.

No matter what your job, there is a Morse Tool of the proper size and type to do it.



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Will Give You Prompt Service*



MORSE

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CONDOR WHIPCORD V-BELTS

*Industry's Turning Power
is its Earning Power . . .*



Condor Whipcord V Belts on large electric driven slush pump in Oklahoma Oil Field

WITH the starting hum of the motor, Condor Whipcord V-Belts seat themselves firmly in the sheaves . . . pick up power smoothly . . . transmit it steadily, constantly to the driven unit.

Day in, day out the performance of Condor Whipcord V-Belts remains the same . . . slip, stretch, internal breakdown have been minimized by placing the endless whipcord strength member in the neutral axis area with an extensible section above, a compression section below.

This original Manhattan construction results in 9-Points of Balance that keep power, production and maintenance costs consistently lower . . . industry's profits consistently higher.

For more turning power . . . and greater earning power . . . put Condor Whipcord V-Belts on your drives. You will find their uniformity, balance and longevity, even in the most difficult service, will result in lower cost sheets.



Condor
PRODUCTS

Transmission Belt
V-Belt
Conveyor Belt
Air Hose
Contractors Hose
Sand Blast Hose
Suction Hose
Fire Hose
Hydraulic Hose
Steam Hose
Water Hose

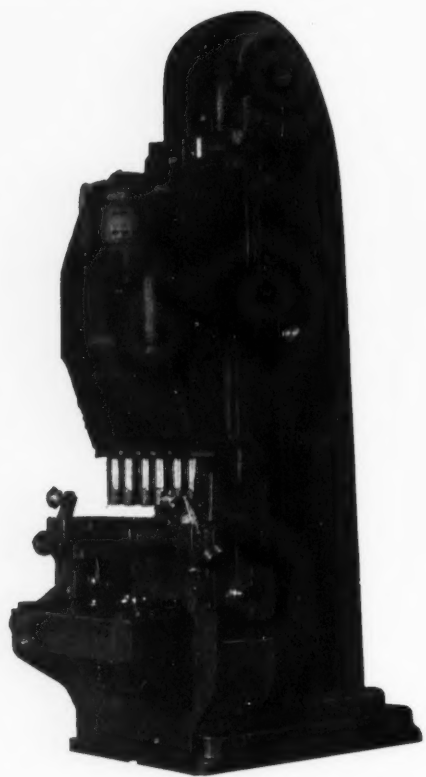
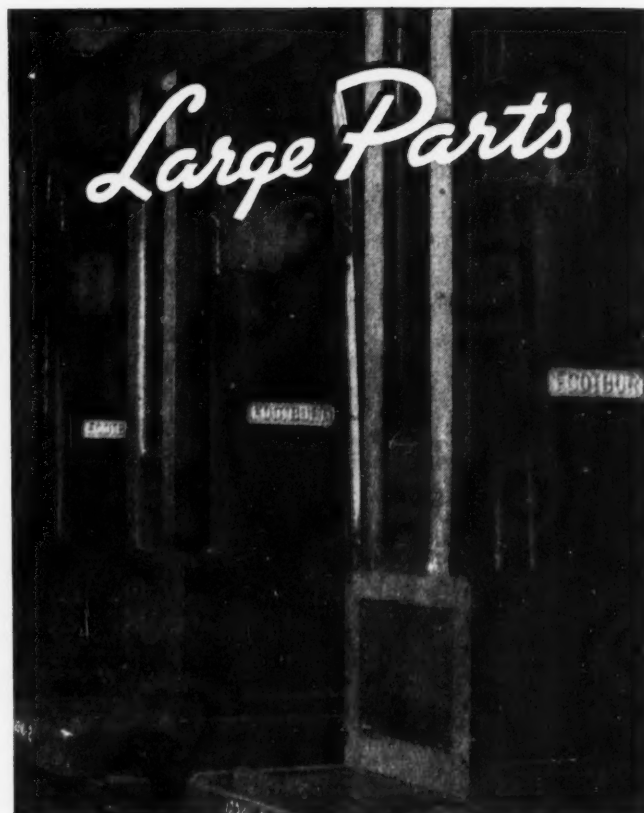
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Rubber Covered Rolls
Abrasive Wheels—
Rubber Bonded

9-POINT BALANCED CONSTRUCTION

1. Minimum Inelastic Stretch.
2. Wide Margin of Strength.
3. Uniform Flexibility.
4. Maximum Resistance to Structural Breakdown.
5. Smooth Running.
6. Maximum Traction.
7. High Resistance to Side Wear.
8. Correct Lateral Reinforcement.
9. Matched Length.



THE MANHATTAN RUBBER MFG. DIVISION
OF RAYBESTOS-MANHATTAN, INC.

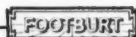


LARGE or small . . . all Footburt parts receive uniform attention from design to assembly. Strict specifications, careful machining and painstaking inspection of parts, insure machines that stand up under severe high production schedules. You will appreciate Footburt quality in your shop on drilling, boring, reaming, tapping or surface broaching work.

THE FOOTE-BURT COMPANY CLEVELAND, OHIO

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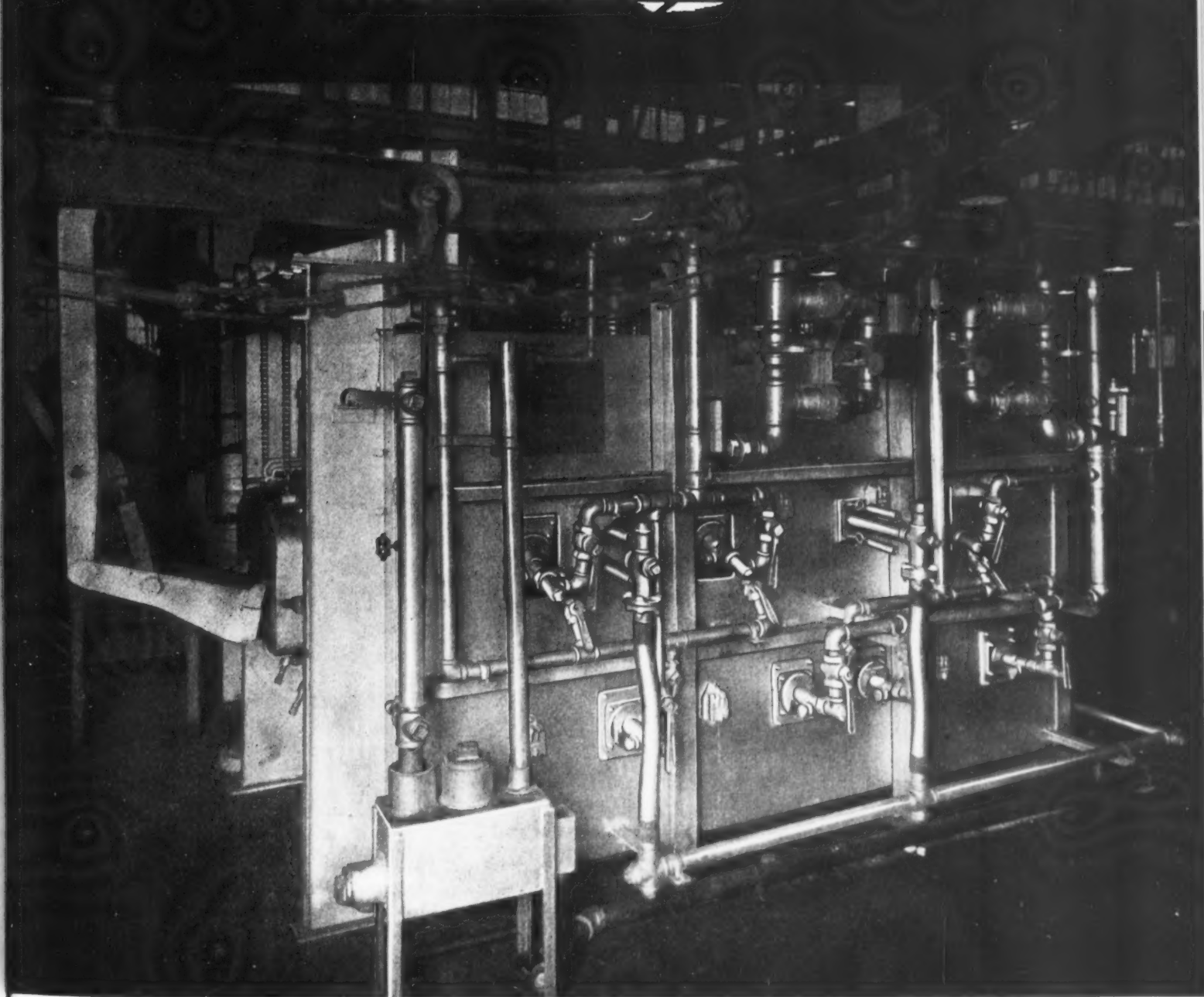
*6-Spindle Stub Type Cylinder Boring Machine for
rough or semi-finish boring cylinders.*



BURNERS IN A

MODERN

GAS CARBURIZING FURNACE



● Exacting specifications are set up by this Cleveland, Ohio tractor manufacturer for the heat treatment of a thousand and one parts that go into the building of tractors for the mucklands of Louisiana's canebrakes and the logging camps of the northwest. SC Automatic Proportioning Gas Burners in these two SC Batch-type Eutectrol furnaces have a very definite bearing upon the ultimate quality of the finished parts carburized in this manufacturer's plant.

A case depth of .045" is specified on parts heat treated. Trays are loaded with an 1800 lb. charge, heated and soaked 4½ hours at 1700°

Fahr. to obtain the desired depth of case. One SC CG gas preparation unit serves both furnaces. SC Single Stage Low Pressure Velocity Burners located in the side walls for over and under firing insure efficiency.

SC Automatic Proportioning Burners are built in 47 types and more than 400 sizes—but all have

air and gas correctly proportioned, mixture maintained automatically *with one-valve control*. It may be said of SC equipment as of any other—a furnace is as good as its burner equipment. For conversion of existing furnaces to the high efficiency and flexibility of gas fuel—call in an SC engineer.

SURFACE COMBUSTION CORPORATION, Toledo, Ohio

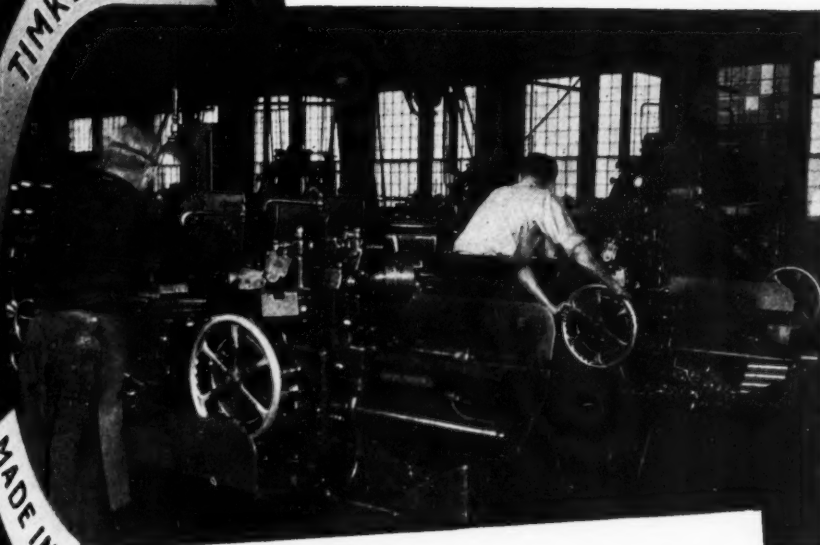
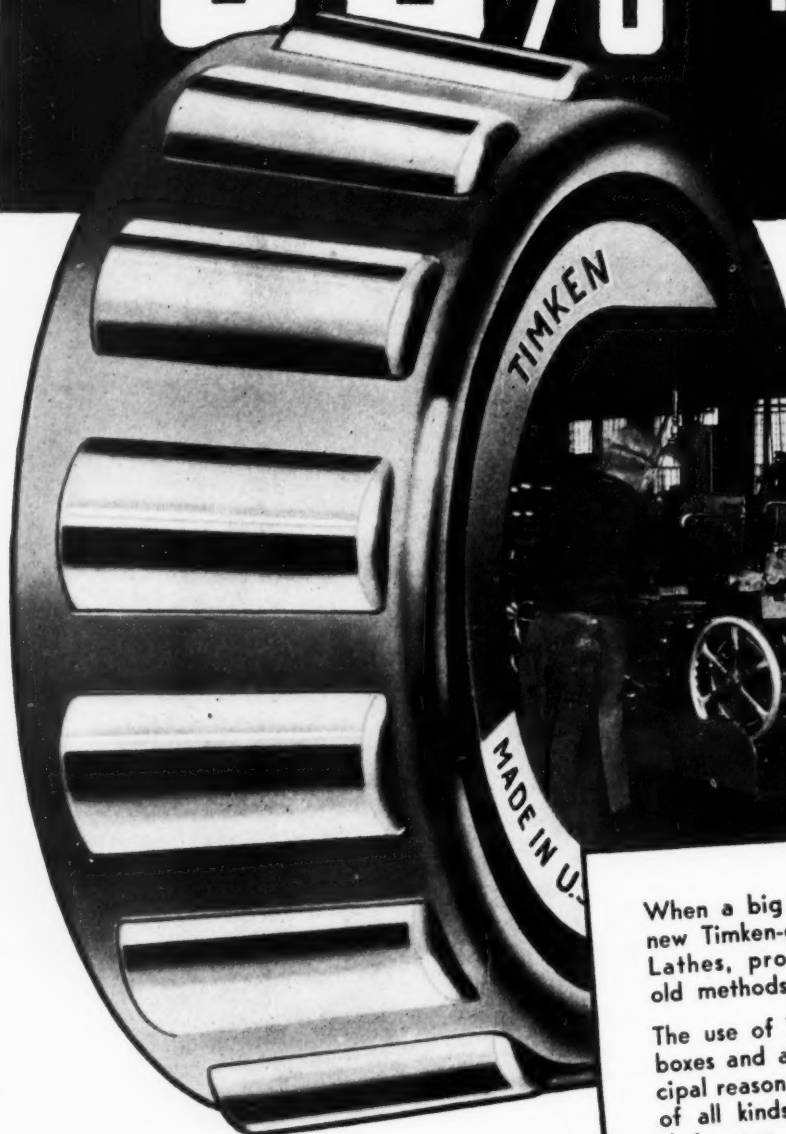
SURFACE
COMBUSTION



Builders of ATMOSPHERE FURNACES and HARDENING, DRAWING, NORMALIZING, ANNEALING FURNACES for CONTINUOUS or BATCH OPERATIONS

30%

PRODUCTION INCREASE



When a big railroad shop recently installed three new Timken-equipped Warner And Swasey Turret Lathes, production was stepped up 30% over old methods.

The use of TIMKEN Bearings on spindles, in gear boxes and at other vital points is one of the principal reasons why modern heavy duty machine tools of all kinds can show such profitable results for their users.

"Timken Bearing Equipped" is closely associated with the extreme precision of Warner And Swasey Turret Lathes at speeds unheard of a few years ago. Check the specifications of quality heavy-duty machine tools—invariably you'll find them Timken-equipped.

THE TIMKEN ROLLER BEARING
COMPANY, CANTON, OHIO

Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; Timken Rock Bits; and Timken Fuel Injection Equipment.

TIMKEN

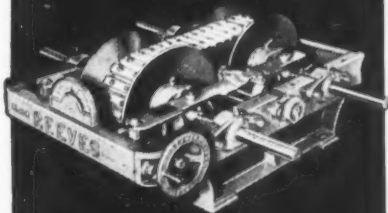
TAPERED ROLLER BEARINGS

WHAT *Three* Manufacturers SAY ABOUT REEVES SPEED CONTROL



Charles F. Van Hook, Vice-President and Chief Engineer, Watson Machine Co., Paterson, N. J.

"... Absolute accuracy in speed adjustability is essential on our wire machinery—not only the ability to select exactly the desired speed, but to maintain it without fluctuation even when the load varies. The REEVES Variable Speed Transmission meets these requirements perfectly."

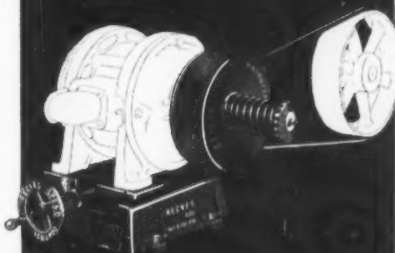


VARIABLE SPEED TRANSMISSION. Provides infinite speed adjustability over wide range. Accurate and positive at all speeds. Modern, compact open and enclosed designs, vertical and horizontal. Fifteen sizes—fractional to 100 H.P. Speed variations 2:1 to 16:1, inclusive.



Fred Seybold, Chief Design Engineer, American Type Founders, Inc., Elizabeth, N. J.

"... Until we learned of the REEVES Vari-Speed Motor Pulley, we thought a variable speed drive was not practical for printing press which we build. But this unit is inexpensive, efficient, compact... and is ideally suited for our use as standard equipment on the ATF Kelly press line."



VARI-SPEED MOTOR PULLEY. Simplified development of Transmission. Mounts on standard shaft of any constant speed motor. Forms direct drive. Through handwheel control, sliding motor base is moved forward or back for speed changes. Seven sizes—fractional to 7½ H.P., 3:1 variation.



Peter Van Vlaanderen, President Van-Vlaanderen Machine Co., Paterson, N. J.

"... that any standard make of motor can be used with your Moto-drive is a distinct advantage... The compact sturdy design of the unit blends in nicely with the modern lines of our machines... Adaptability for mounting and accessibility of internal parts also appeal to us."



VARI-SPEED MOTO-DRIVE. Combines in one compact, self-contained enclosure—any standard constant speed motor (foot type, ball-bearing), REEVES speed varying mechanism and reduction gears (where required). Horizontal and vertical types—¼ to 10 H.P. Speed variations 2:1 to 6:1, inclusive.

REEVES

Send For This FREE Book

Describes the complete REEVES line of speed control equipment—units in a wide range of designs, sizes, speed ratios and controls to meet your individual needs correctly. Illustrates many applications. Gives new engineering data.



SPEED CONTROL


REEVES PULLEY COMPANY, COLUMBUS, INDIANA

Send, without obligation, information on applying Speed Control as standard equipment, as contained in your 118-page Speed Control Handbook. M-8-37

Name

Company

Address



**A
DEPENDABLE LINE
GETS RESULTS**

THE STANDARD TOOL CO.
Cleveland

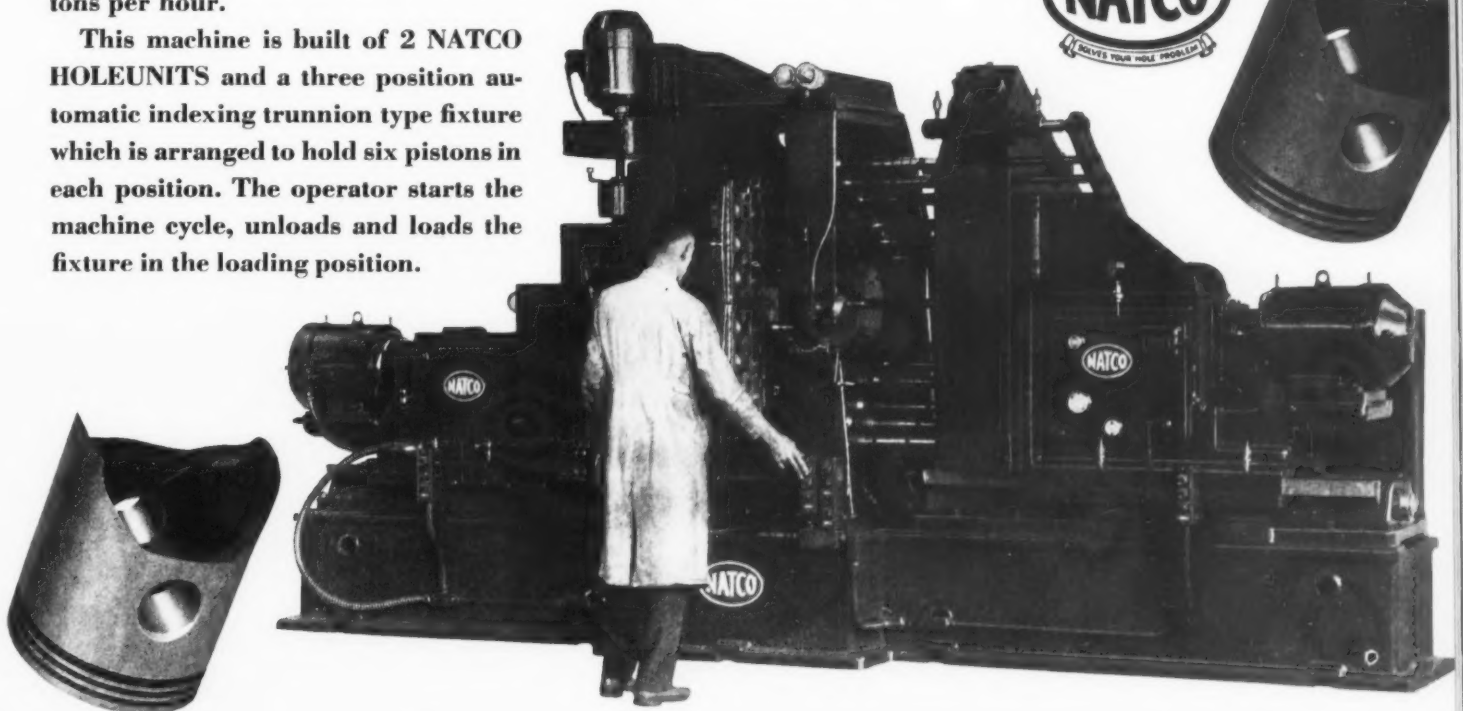
NEW YORK • DETROIT • CHICAGO
TWIST DRILLS • MILLING CUTTERS • TAPS • DIES • REAMERS
DRILL CHUCKS • WHEEL DRESSERS • SPECIAL TOOLS

450 Pistons are Bored and Reamed Per Hour by this NATCO Machine

The NATCO two-way machine shown below is being used by a prominent automobile manufacturer to single point bore, chamfer and align ream the wrist pin holes in 450 to 500 cast iron pistons per hour.

This machine is built of 2 NATCO HOLEUNITS and a three position automatic indexing trunnion type fixture which is arranged to hold six pistons in each position. The operator starts the machine cycle, unloads and loads the fixture in the loading position.

Yes, we believe this is a good example of combining operations on a multiple of parts to reduce production costs. Investigate the possibilities of NATCO HOLEUNITS today.



Combine Boring, Chamfering and Reaming Reduce Your Costs with a NATCO

It's the little savings . . . here and there in your production line . . . which build up your profits. NATCO Engineers will be glad to go over your various drilling, boring and tapping problems. Without any sort of an obligation on your part we will make a careful survey and make our recommendations . . . then you be the judge as to whether we can increase your profits. Send

in prints of your work or call a NATCO representative today.

Chicago Office, 2009 Engineering Bldg., 205 West Wacker Drive; Detroit Office, 409 New Center Bldg.; Factory and Home Offices, **The National Automatic Tool Company, Richmond, Indiana, U. S. A.**



NATCO

Drilling, Boring,
and Tapping Equipment

BECAUSE NEW MACHINES ARE MUCH IMPROVED

You Can Make the Junk Pile a Stepping Stone to Lower Costs

NEW profits are resulting from the scrapping of old machines and replacing them with new, improved equipment — every branch of the metal-working industry is adopting this method of meeting today's keen-edged competition. Old machine tools are being discarded, not because they are *old*, but because they cannot be profitably operated in the face of competition.

Today's high-speed, high-precision tools call for motors and control of the highest quality. In your cost-reduction program, insist on General Electric motors and control for your new machines. The marked preference for them today is soundly based on two fundamental characteristics — long life and low cost of operation. General Electric Company, Schenectady, N. Y.

Make Three Inventories THIS YEAR!

1. Inventory the machine tools you are now using.
2. Inventory the progress made by machine-tool builders since your machines were purchased.
3. Inventory the progress made by General Electric in improving electric equipment to meet the present-day demands.

New National Acme Automatic
Screw Machine, equipped
with G-E motors and controls

GENERAL  **ELECTRIC**

011-174

Red Ring GEAR LAPPING

THE new GLF Red Ring Lapping Machine brings to use modern hydraulic control to further the production of quieter, better gears at much lower cost. The new machine is simpler, has greater rigidity and is much easier to set up and operate.

The new hydraulic control not only makes available practically any lapping cycle . . . it also permits lapping one side of the tooth more than another . . . an important advantage in the manufacture of drive gears.

The GLF will correct errors of .002" or even more, in spiral angle, eccentricity, involute curvature and tooth spacing in a lapping time of one to five minutes per gear. Grinding time for the same corrections amounts to as much as 20 to 30 minutes, with no greater final precision. The difference in cost is overwhelmingly in favor of Red Ring Lapping.

In the patented principle of crossed axis lapping which is employed, the lap drives the work gear at relatively high speed, at an angle to the work and at the same time this work gear is reciprocated across the face of the lap. This produces a self generating action of involute form over the entire surface of each tooth. Cramp or power tail stock lapping are available on choice in the same machine. Lap cost per gear is negligible, as laps are inexpensive and long lasting. Submit blueprints for definite proposal.

THE NEW GLF WITH HYDRAULIC CONTROL



Patents applied for and issued
1989660; 1989661; 1989662

**NATIONAL BROACH
AND MACHINE CO.**
SHOEMAKER and ST. JEAN • DETROIT, MICH.

H-W TAPS

*Rugged
without sacrificing
Accuracy*

Where accuracy of threading must be maintained in long runs, ruggedness need not be sacrificed. H-W Taps turn out greater amounts of work between grinds, yet even after repeated sharpenings they retain their accuracy.

Why? Because H-W Taps are made of carefully selected steel. Because every dimension is carefully controlled in the final finishing. And because they are FINISHED AFTER HARDENING by the Hanson Process.

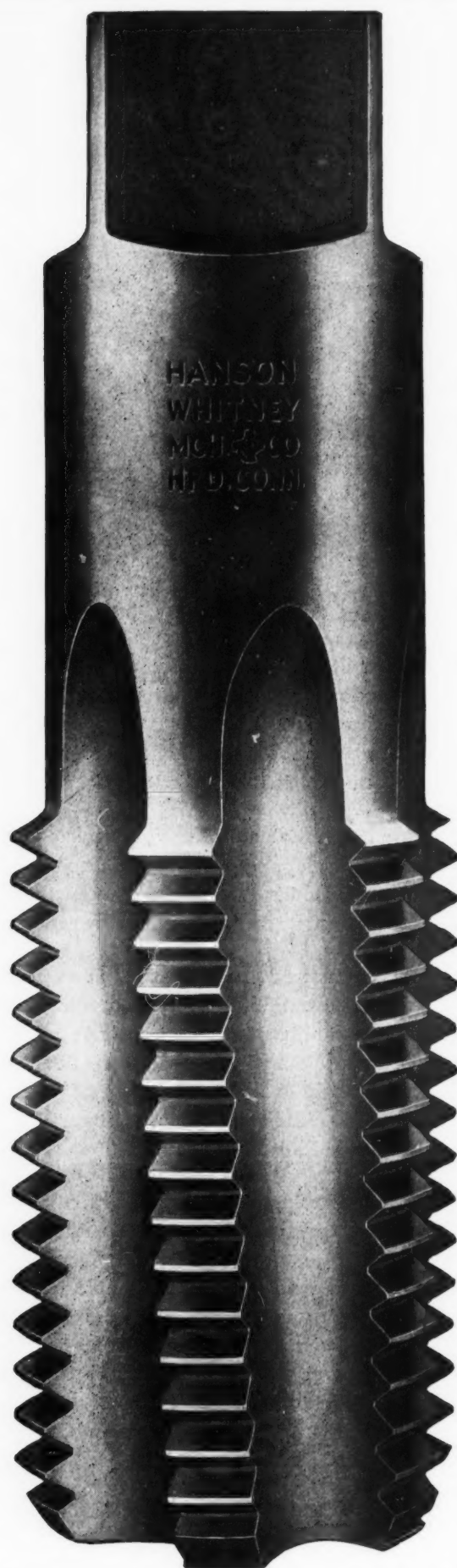
Remember when buying taps the initial cost is not the last cost. The best economy is to buy the best. Their long life and continued accuracy will prove — by RESULTS — the economy of equipping your machines with H-W Taps.



THE HANSON-WHITNEY MACHINE CO.
HARTFORD, CONN.

DOMESTIC REPRESENTATIVES

MACHINERY AND SMALL TOOLS: Cincinnati, Ohio, Seifreut-Elstad Mchry. Co.; Dayton, Ohio, Seifreut-Elstad Mchry. Co.; Detroit, Michigan, A. G. Brice-Berry Thomas; New York, N. Y., L. C. Bigelow & Co., Inc.; Pittsburgh, Pa., William K. Stamets; Toronto and Montreal, Canada, Arthur Jackson Machine Tool Co. MACHINERY ONLY: Chicago, Illinois, Marshall & Huschart Mchry. Co.; Cleveland, Ohio, William K. Stamets; Philadelphia, Pa., Lloyd & Arms, Inc. SMALL TOOLS ONLY: Chicago, Ill., M. Ray Pearce; Cleveland, Ohio, George A. Whalon; Milwaukee, Wis., George M. Wolff, Inc.; Philadelphia, Pa., General Tool Sales Co.



SHAHER

CONCAVE ROLLER DESIGN

Shafer CONCAVE roller design combines in a simple, efficient bearing the essential features of 1. Rolling self-alignment within the bearing itself, 2. Capacity for radial, thrust, or any combination of radial-thrust loads, 3. Simple adjustability.

This exclusive combination means greater adaptability to the majority of industrial uses and a reserve of performance to meet even the severest operating conditions.

SHAHER BEARING CORPORATION
35 East Wacker Drive Chicago

AVAILABLE IN A FULL RANGE OF SIZES: PILLOW
BLOCKS • FLANGE UNITS • TAKE-UP UNITS • HANGER
BOXES • CARTRIDGE UNITS • DUPLEX UNITS • CON-
VEYOR ROLLS • RADIAL-THRUST ROLLER BEARINGS



EVERYTHING YOU NEED IN A ROLLER BEARING

MACHINERY, August, 1937—69



High Speed Chipping

6,000 B. P. M. (BLOWS PER MINUTE)

In tool rooms and in production work the new style controlled speed Series 60 Kipp Air Chippers are doing a thousand and one jobs faster than by any other method.

The U. S. A. Price: \$19.75. Free Trial Offer! Any concern with satisfactory credit rating may try out this tool for ten days. May we send one to you so you can demonstrate this tool to yourself.

Sole Agent in England, Wm. Coulthard & Co., Ltd., Carlisle

MADISON-KIPP CORPORATION
203 WAUBESA ST. MADISON, WISCONSIN U.S.A.

BALANCE

Dynamic AS WELL AS *Static*

One expects transmission equipment to be statically balanced, but Allis-Chalmers has now made, commercially available, a Texrope Sheave with the finest Dynamic Balance, for applications that require complete lack of vibration at all speeds. Not all applications require this extreme precision, but Allis-Chalmers has made it available for those that do, and the engineering ability capable of producing the Allis-Chalmers Dynamically Balanced Texrope Sheave is inherent in all Texrope equipment. • Allis-Chalmers engineers conceived and developed the multiple V-Belt principle, the Duro-Brace Texrope Sheave, Vari-Pitch Texrope Sheave, and now offer a new high standard in Dynamically Balanced Sheaves for Texrope V-Belt Drives. If you want the finest and the most advanced multiple V-Belt transmission equipment, for every application, you want Allis-Chalmers Texrope Drives.

Write for Vari-Pitch Bulletin
No. 1261

Belts by Goodrich

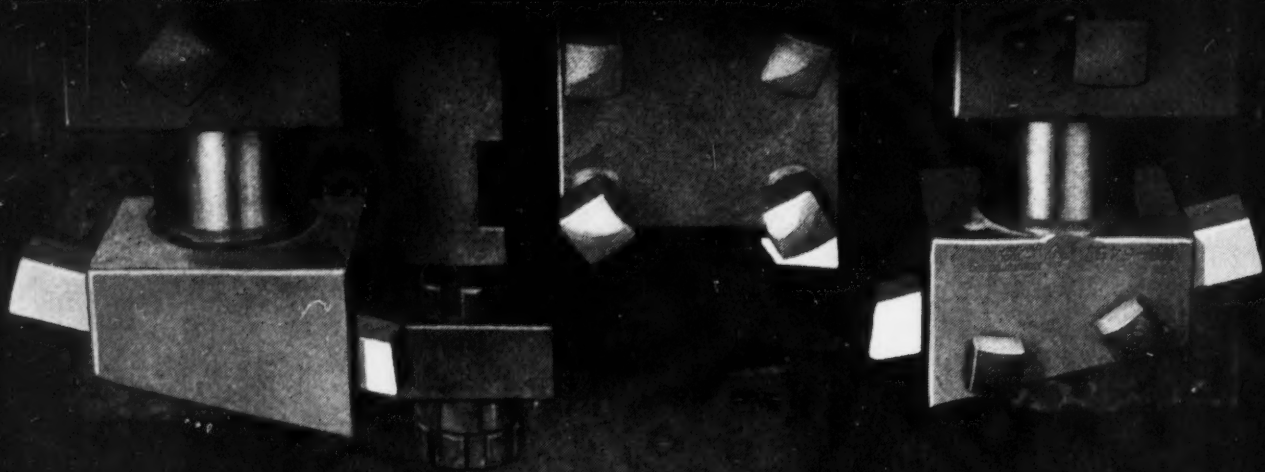


ALLIS-CHALMERS

M I L W A U K E E W I S C O N S I N



PROFITS ON SHORT RUNS *with* MULT-AU-MATIC ECONOMY



Standard Tooling — Ease of tool change-over from job to job — flexibility — all combine to make the Bullard Multi-Au-Matic a machine easily adaptable to medium quantity or larger volume production without material sacrifice in effective operating Economy and Profitable Efficiency.

Many manufacturers have discovered the Profitable Multi-Au-Matic possibilities on short runs and are using these machines to their advantage.

Today's Economic Problems require increased manufacturing Efficiency. Investigate these machines and Let us answer the Question, "Do Multi-Au-Matics pay for themselves — a Profit on short run jobs?"

THE BULLARD COMPANY

BRIDGEPORT

CONNECTICUT



**IN THE
SPOTLIGHT**

GOOD PERFORMERS

WILLIAMS' "C" CLAMPS

Drop-forged, then heat-treated for extra stiffness and strength. Five patterns, 3/4 to 18" gap, for light, general and heavy duty, give the kind of service that results in more and better production.

"VULCAN" LATHE DOGS

Drop-forged from a strong, tough grade of specially selected steel. Bent and Straight Tail patterns, 3/8 to 6"; hardened screws—hollow-head for safety—or conventional set screw, as desired.

"VULCAN" STRAP CLAMPS

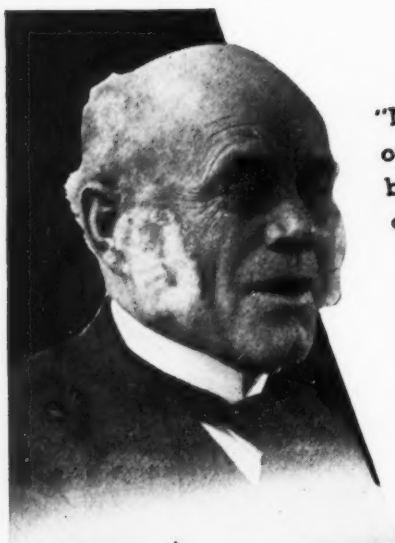
Far more convenient and efficient than any make-shift device. "Vulcans" provide the modern method of clamping work on lathe, planer, drill press, milling and boring machines, etc. Six patterns, 20 sizes cover every need.

Buy From Your Distributor

J. H. WILLIAMS & CO.

75 Spring St., New York

Headquarters for: Drop-Forged Wrenches (Carbon and Alloy), Detachable Socket Wrenches, "C" Clamps, Lathe Dogs, Tool Holders, Eye Bolts, Hoist Hooks, Thumb Nuts and Screws, Chain Pipe Tongs and Vises, etc., etc.,



"My production game is 'way over par, Lad. Too many strokes between the tee square and the output!"



"You're using the wrong iron, Pop! Here's how to keep out of the moulding sand traps and defect hazards... cut out those machining slices... and put hard-cash eagles on the score card. Drive 'em straight with welded steel!"

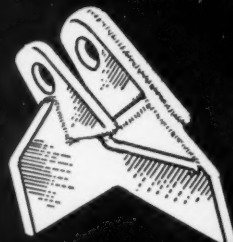
Sketchbook of Welded Parts



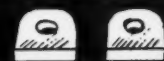
\$4.39—Cost of the superseded cast steel bracket.



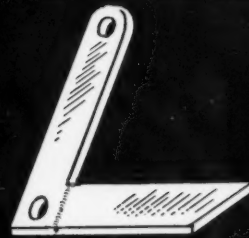
Component parts of rolled steel for welded design.



\$2.95—Cost of the new welded steel bracket.



LESS MACHINING NOW—Formerly cast, it was necessary to drill the bearing bosses of the lever individually. Now of welded steel design, rolled steel bosses are drilled in stacks of 25, then welded to the rolled steel lever. Costs are 40% less than the old way



MADE FROM BAR STOCK—This lever required a sharp corner to reinforce the bearing hole. It is welded from two pieces of bar stock, one of which is sheared with bevelled end, giving a V for a flush butt weld. It's cheaper than casting by 30%.

Write for Machine Design Application Sheets. Issued Periodically.

THE LINCOLN ELECTRIC COMPANY, DEPT. B-401, CLEVELAND, OHIO
Largest Manufacturers of Arc Welding Equipment in the World

LINCOLN SHIELD-ARC WELDING

BUILDS LIGHTER AND STRONGER PRODUCTS • FASTER • AT LESS COST

THIS new kind OF HYDRAULIC PRESS

● simplifies many manufacturing operations

Hannifin "Hy-Power" Hydraulic Riveters and Presses set an entirely new standard of performance in many types of manufacturing operations involving the use of pressure. They are being used for punching, riveting, pressing, crimping, press assembly, and similar work, making these operations simpler and easier to handle and providing remarkable increases in production.

The exclusive Hannifin "Hy-Power" hydraulic operation provides a fast and completely automatic cycle, push-button controlled. The standard cycle includes: 1. Rapid advance stroke; 2. Automatic high pressure; 3. Reversal at maximum pressure; 4. Rapid return to starting position. The pump idles at zero pressure between cycles. Speed varies from $1\frac{1}{2}$ seconds for a $17\frac{1}{2}$ ton unit to 3 seconds for a 50 ton, 4 inch stroke unit.

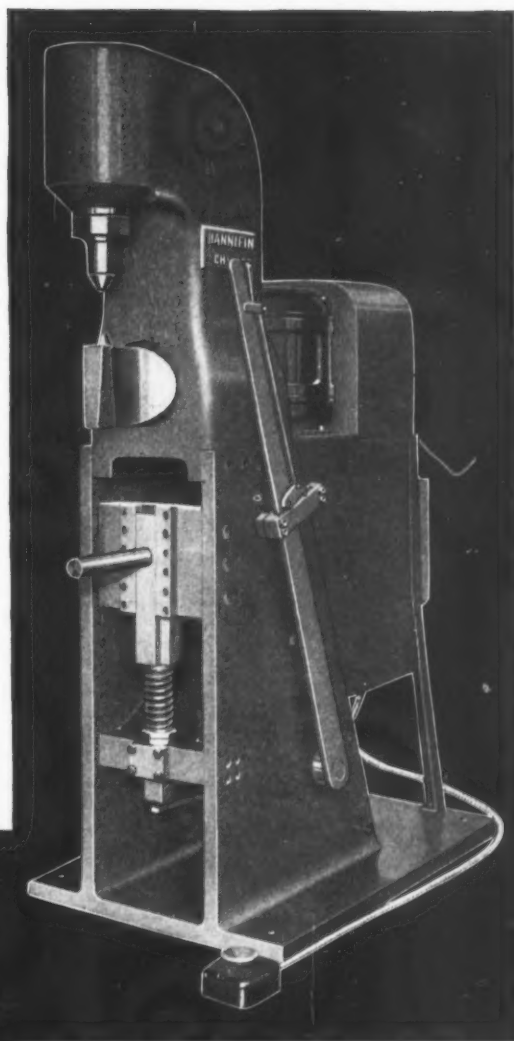
Hannifin "Hy-Power" Hydraulic Presses are available in both portable and stationary types, capacities 2 tons to 50 tons or over, and with any type of yoke or fixture to suit individual requirements. The individual hydraulic power units are motor driven.

Bulletin 40 describes Hannifin "Hy-Power" units and many other special types of hydraulic presses. Write for a copy, or consult Hannifin engineers for specific recommendations.

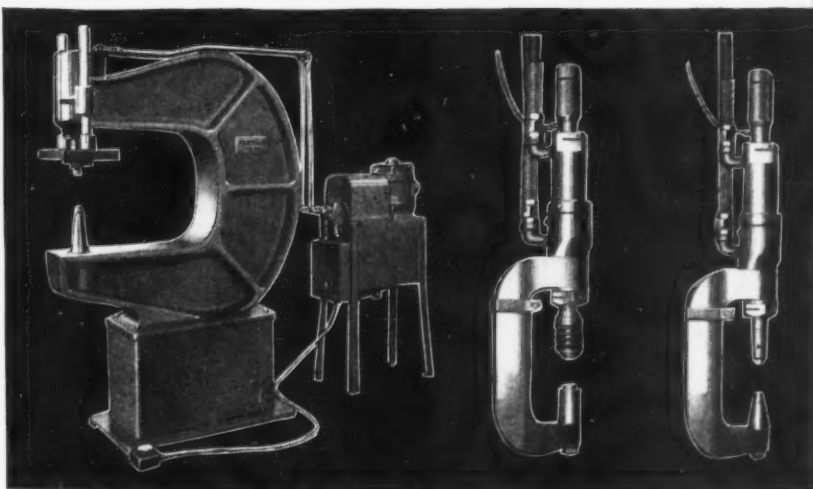
HANNIFIN MANUFACTURING COMPANY

621-631 South Kolmar Avenue

Chicago, Illinois



● 50 ton "Hy-Power" Hydraulic Riveter for riveting lugs on tractor wheels. Holding fixture with spring pressure pad is adjustable for different wheel sizes. Stroke 3 in., gap $3\frac{1}{2}$ in., reach 6 in. Time cycle 3 seconds.



● 35 ton "Hy-Power" Hydraulic Punch and Riveter, adaptable to a variety of work. Ram has platen for mounting strippers or other fixtures. Stroke 6 in., gap $14\frac{1}{2}$ in., reach 30 in. Time cycle 4 seconds.

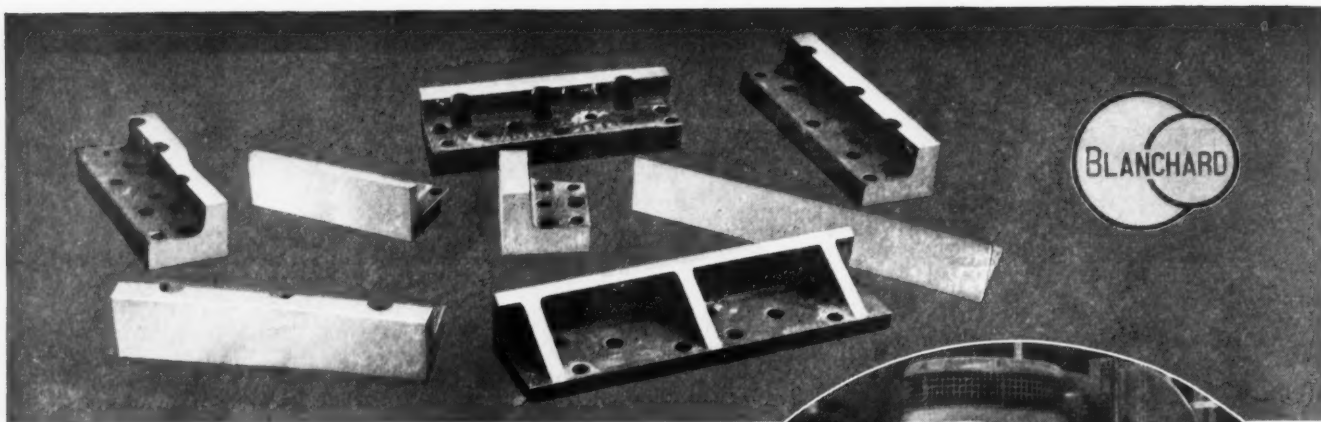
● Left— $7\frac{1}{2}$ ton "Hy-Power" Portable Hydraulic Punch and Riveter for production punching and riveting of light gauge steel sheets. Both units operated from a single "Hy-Power" hydraulic pressure generator equipped with automatic transfer valve. Time cycle approximately $1\frac{1}{2}$ seconds.

"hy-power"

Patented

ENGINEERS • DESIGNERS • MANUFACTURERS • PNEUMATIC AND HYDRAULIC PRODUCTION TOOL EQUIPMENT

MACHINERY, August, 1937—75



Die Work

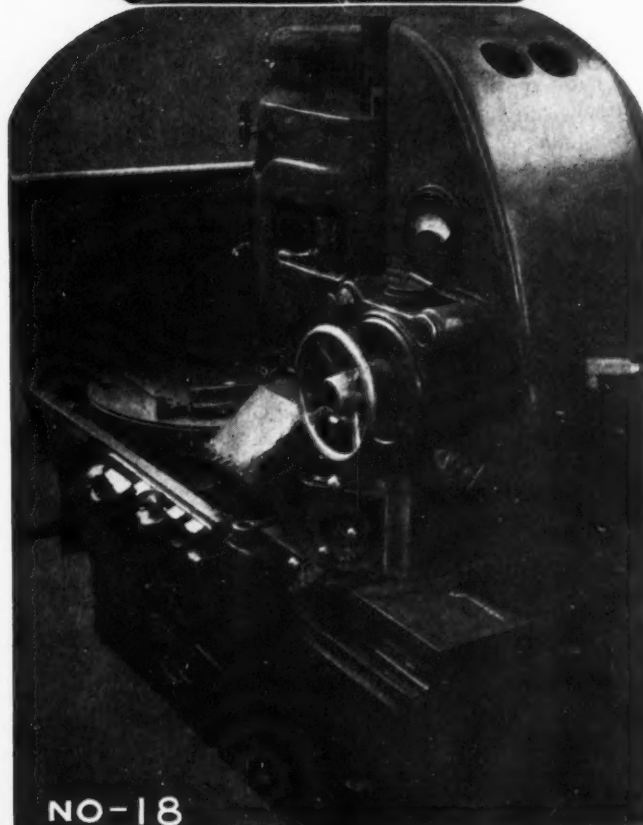
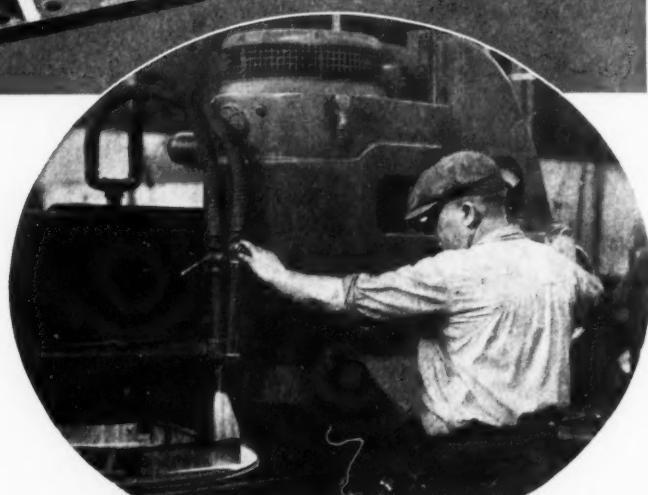
in great variety
ground with speed
and safety

The speed and safety of Blanchard Grinding are especially important on die work.

Speed — because a variety of work can be quickly handled without loss of time between jobs.

Safety — fast grinding without burning die, because of high work speed — ample water supply — and ability to use soft free cutting wheels.

If you use dies, we suggest that you send us one or two and then either come to our factory and see them ground or let us submit to you the data on the Blanchard Grinding operation.



NO-18

THE BLANCHARD MACHINE COMPANY

64 State St.,
Cambridge, Mass., U. S. A.

The GREAT ICE-PLANT MYSTERY



Read how Shell ingenuity helped solve this lubrication problem

THE Mattoon Crystal Ice Company of Mattoon, Illinois, faced a shutdown! The main-shaft bearing driving the ammonia compressor was mysteriously overheating!

Shell went to work with Mattoon engineers. The cause of the trouble was discovered in a worm and gear operating the valve action. Lubrication failure at this point was transmitting heat to the adequately lubricated main-shaft bearing!

At Shell's recommendation, the Shell Grease particularly suited to this type of lubrication

was applied to the worm and gear. Immediately, the main-bearing temperature was reduced to normal! Subsequent examination over a period of two years showed no wear on worm or gear. Today the Mattoon Crystal Ice Company is 100% Shell lubricated... and operating at peak efficiency!

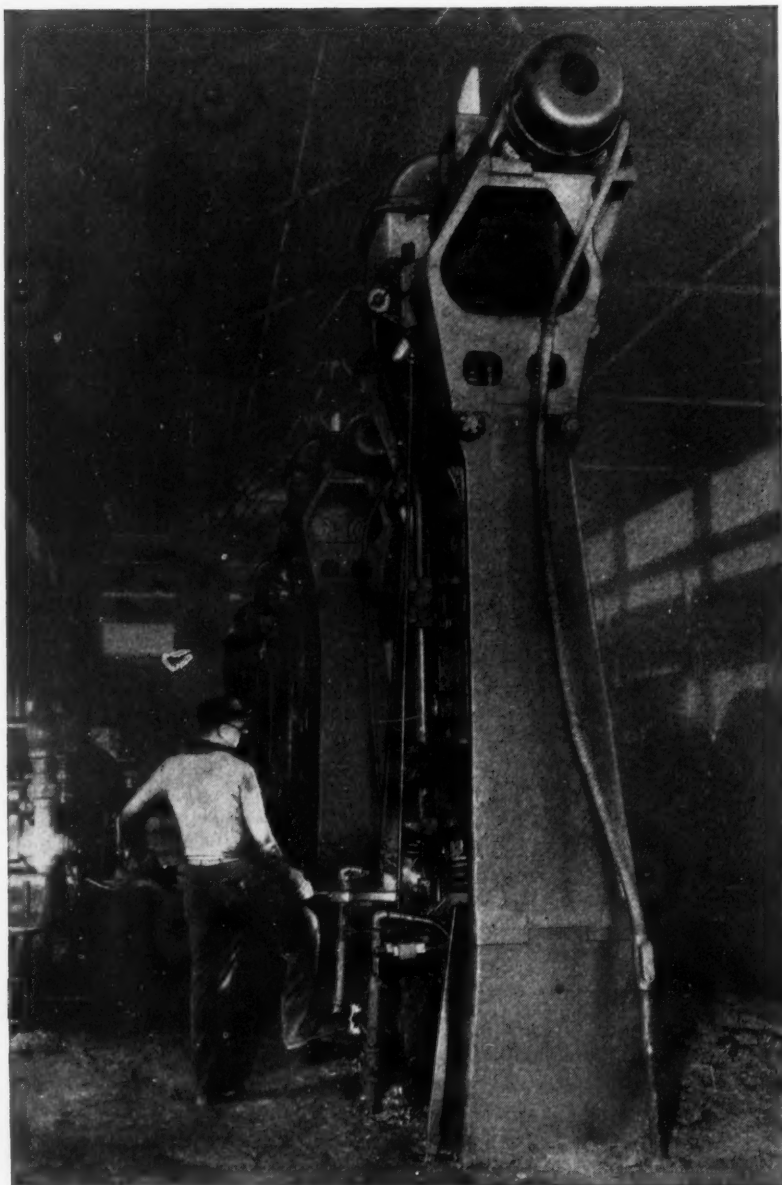
Remember this: More than the correct application of the correct lubricant solved Mattoon's problem. The ingenuity and resourcefulness of a great refiner were put to work on this job. This *plus* in lubrication is always ready to solve your problems. Call or write your nearest Shell office.

Shell's "Invisible Element" is a combination of Shell's unmatched world-wide resources; Shell's modern laboratories and refineries; years of cumulative experience in research by Shell's engineers and scientists. It is the determination to make lubrication more efficient, more economical for you.



SHELL INDUSTRIAL LUBRICANTS

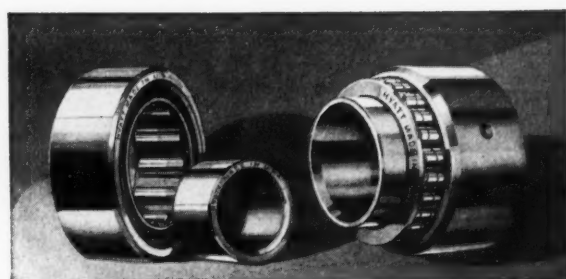
MACHINERY, August, 1937—77



In heavy drop hammer service today, ordinary bearings would not last very long, but when sturdy Hyatts are employed, as in these machines built by **CHAMBERSBURG ENGINEERING COMPANY**, the matter of bearing wear and care is forgotten.

Where
Wear
is a problem...
the answer
is HYATTS

• Hyatt Roller Bearings are designed and built to withstand the strains of punishing speeds and loads, to preserve the original accuracy of the related parts they serve. Wear and its resultant difficulties are reduced to a minimum by these better bearings. Thus, to your own operating equipment, or to the machines you build, Hyatts contribute permanent bearing satisfaction, long life, and maintenance economies. Hyatt Bearings Division, General Motors Corporation, Newark, Detroit, San Francisco. Hyatt Roller Bearing Sales Company, Chicago and Pittsburgh.



HYATT
ROLLER BEARINGS

KEEP ON "Sweeping the Corners"

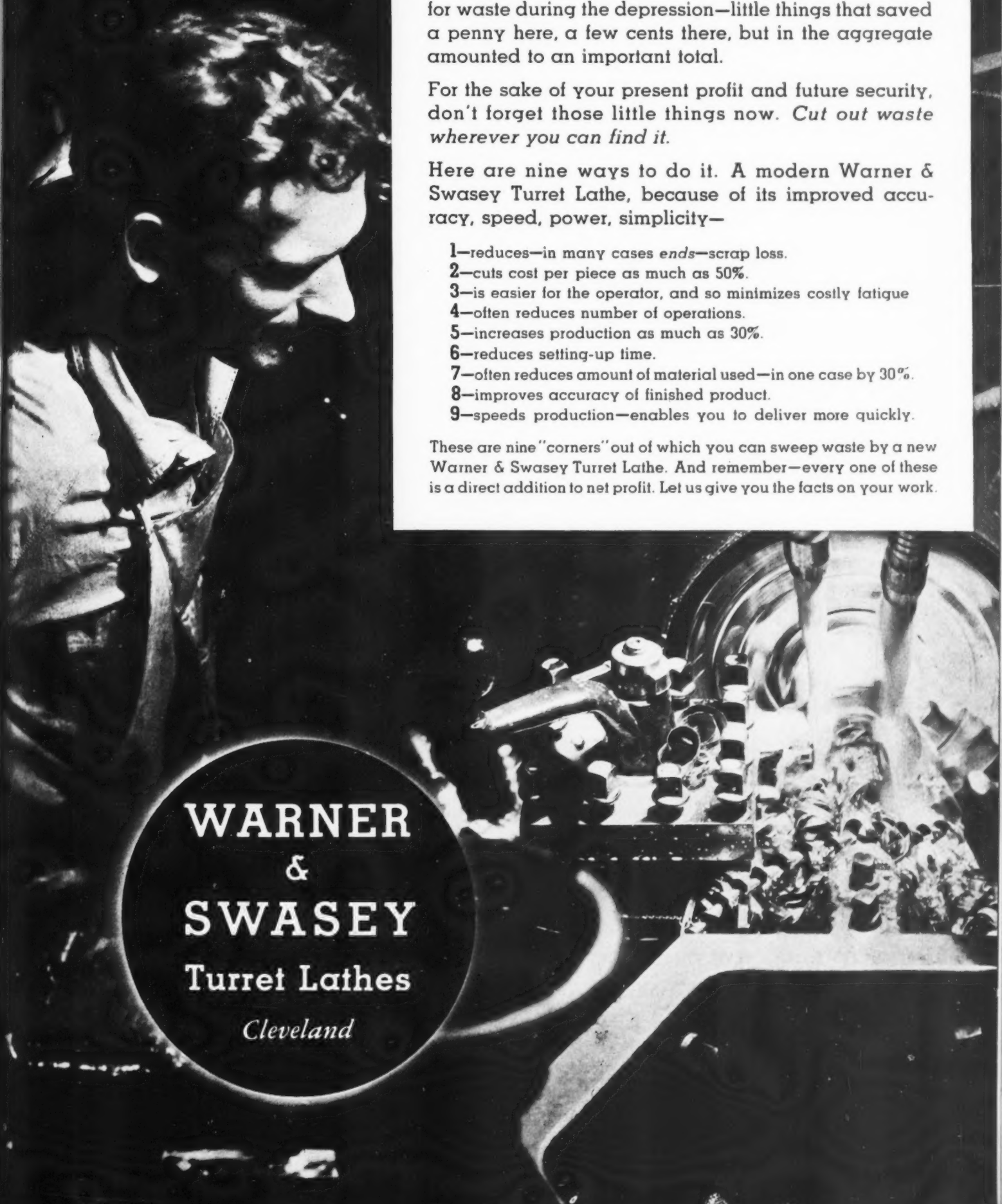
IT'S easy to forget, in good times like these, the lessons we learned in the depression. Easy—and dangerous. Most companies learned to "sweep up the corners" for waste during the depression—little things that saved a penny here, a few cents there, but in the aggregate amounted to an important total.

For the sake of your present profit and future security, don't forget those little things now. *Cut out waste wherever you can find it.*

Here are nine ways to do it. A modern Warner & Swasey Turret Lathe, because of its improved accuracy, speed, power, simplicity—

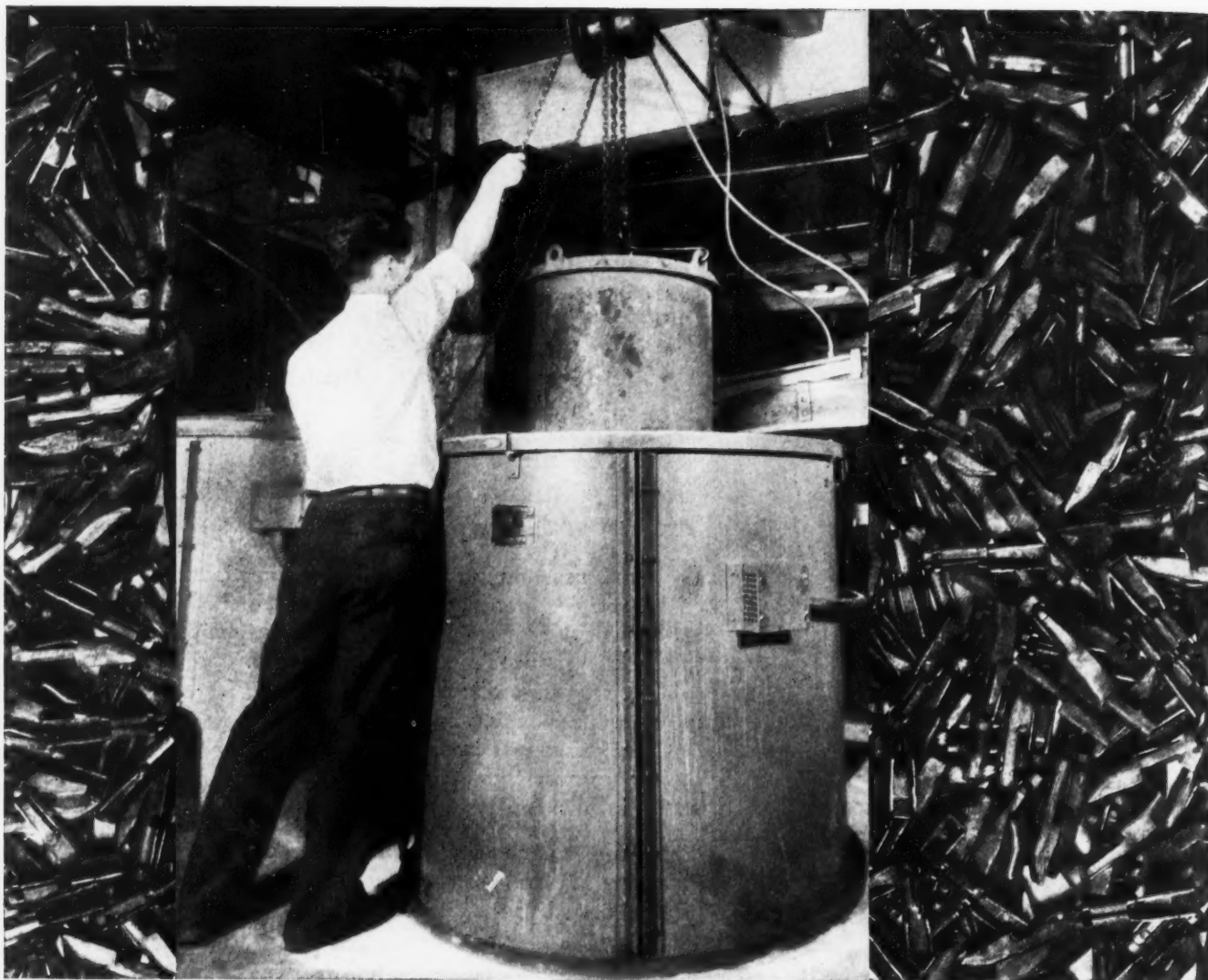
- 1—reduces—in many cases *ends*—scrap loss.
- 2—cuts cost per piece as much as 50%.
- 3—is easier for the operator, and so minimizes costly fatigue
- 4—often reduces number of operations.
- 5—increases production as much as 30%.
- 6—reduces setting-up time.
- 7—often reduces amount of material used—in one case by 30%.
- 8—improves accuracy of finished product.
- 9—speeds production—enables you to deliver more quickly.

These are nine "corners" out of which you can sweep waste by a new Warner & Swasey Turret Lathe. And remember—every one of these is a direct addition to net profit. Let us give you the facts on your work.



**WARNER
&
SWASEY**
Turret Lathes

Cleveland



Uniformity? O. K.

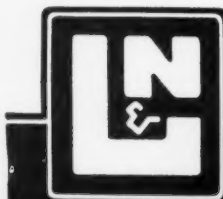
Parts are treated in HOMO FURNACES

To get the highly uniform heat they need for identical hardening, these little "contact clips" of cadmium-plated beryllium copper go into one of International Business Machines' Homo Furnaces. Fifty thousand at a time, they are put into a pre-heated Homo. Its blast of electrically-heated air whisks them up to 530° F., and holds them there for a 45-minute soak.

Worked out in IBM's first Homo Furnace, this operation

is now carried out in a new and larger Homo of the same type. To the original Homo principle, this Furnace adds refined design, improved materials and the latest developments in control appliances. It is one of a complete line, made in various models and types, from which a furnace can be selected for most efficient operation at 1400° F. or below on either non-ferrous or ferrous parts—open loads, medium ones, or dense.

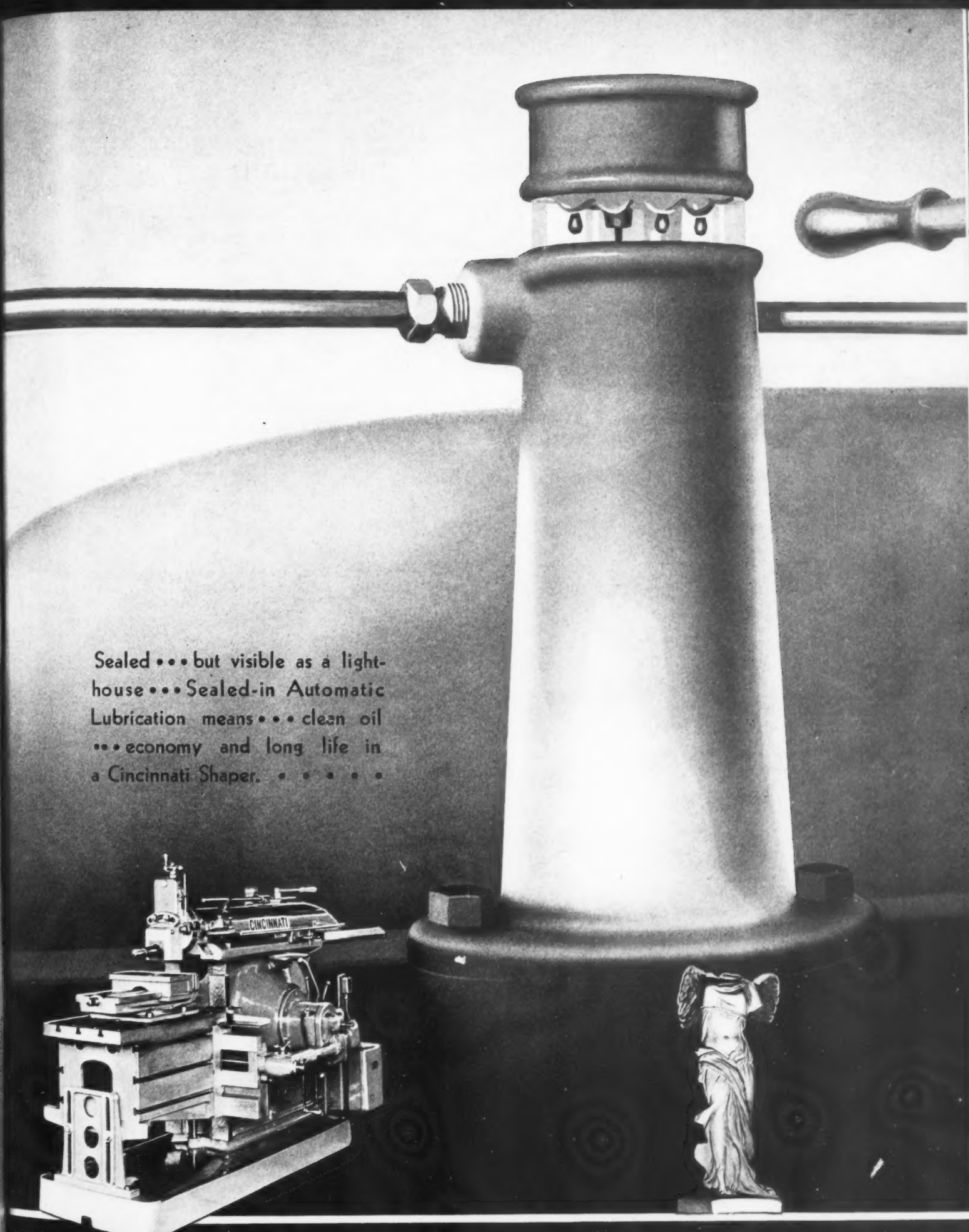
J-T-625 (6)



LEEDS & NORTHRUP COMPANY, 4921 STENTON AVE., PHILA., PA.

LEEDS & NORTHRUP

MEASURING INSTRUMENTS • TELEMETERS • AUTOMATIC CONTROLS • HEAT-TREATING FURNACES



Sealed... but visible as a light-
house... Sealed-in Automatic
Lubrication means... clean oil
... economy and long life in
a Cincinnati Shaper.

THE CINCINNATI SHAPER COMPANY, CINCINNATI, OHIO

SHAPERS • SHEARS • BRAKES

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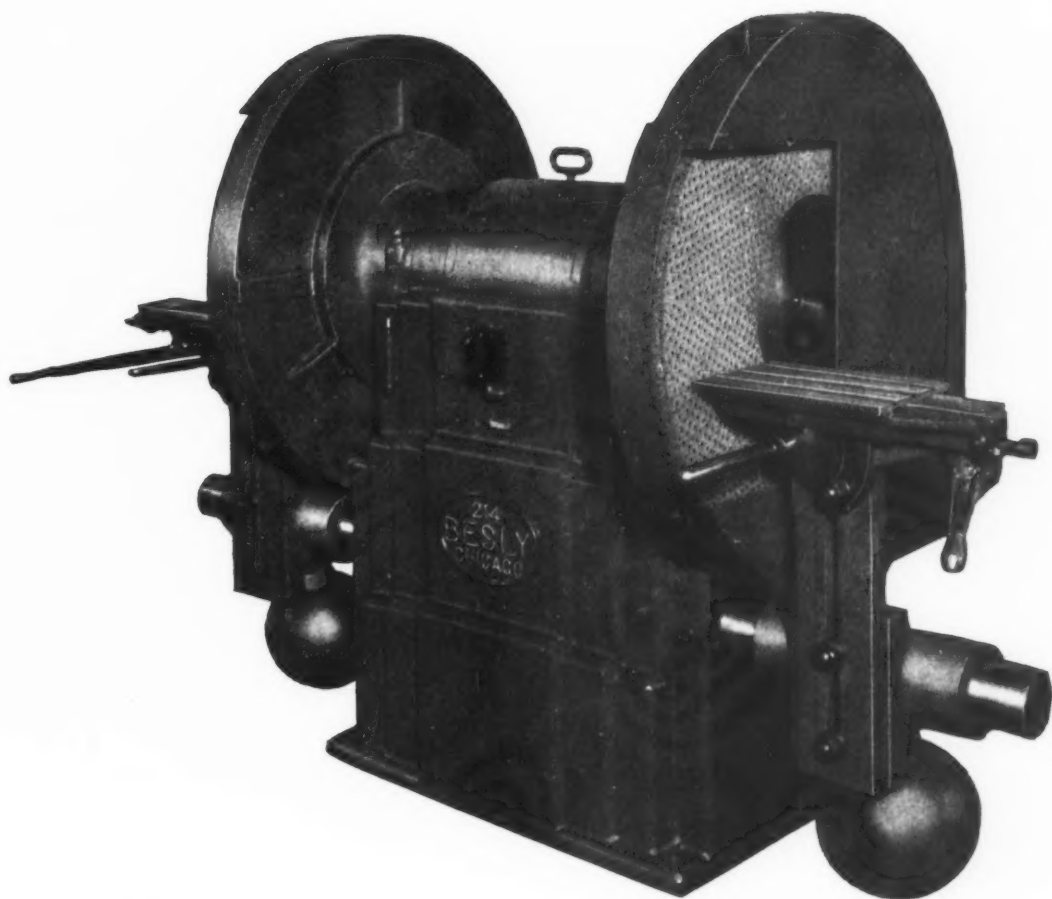
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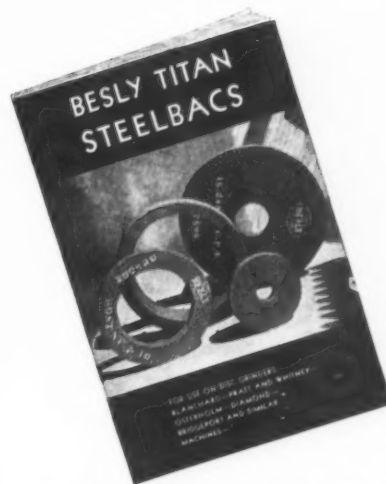
Your Progress Depends Upon Your Knowledge of Your Industry

Keeping pace with improvements in Abrasive Discs



Besly Titan Steelbac Abrasive Discs (Resinoid Bonded) with 1", 2" and 3" of useable abrasive were introduced by us and have been adopted by most progressive manufacturers. • Our next step was to bring out a line of Disc Grinders capable of carrying these improved heavy grinding members. Illustration shows a No. 214 Besly Grinder which is one of a series of machines developed to meet modern conditions. This machine has 40" grinding members with oversize Geared Lever Feed Tables. The Rockershafts are larger than heretofore. The Wheel Collars backing up the Steel Disc Wheels are 22" diameter. The spindle is almost 4" diameter in the bearings. Heavy Welded Steel Hoods protect operator, while the sturdy, well proportioned base helps absorb the vibration always present in a grinding machine.

This type of Besly Grinder is built in various sizes to carry 15" to 40" diameter grinding members, all with Multiple Vee Belt Drive employing standard motor mounted at rear of base. If you are thinking of replacing your old Disc Grinder, be sure and get details concerning these newly designed Besly Grinders.



[[Write for your copy of Booklet
on Besly Titan Steelbacs.]]

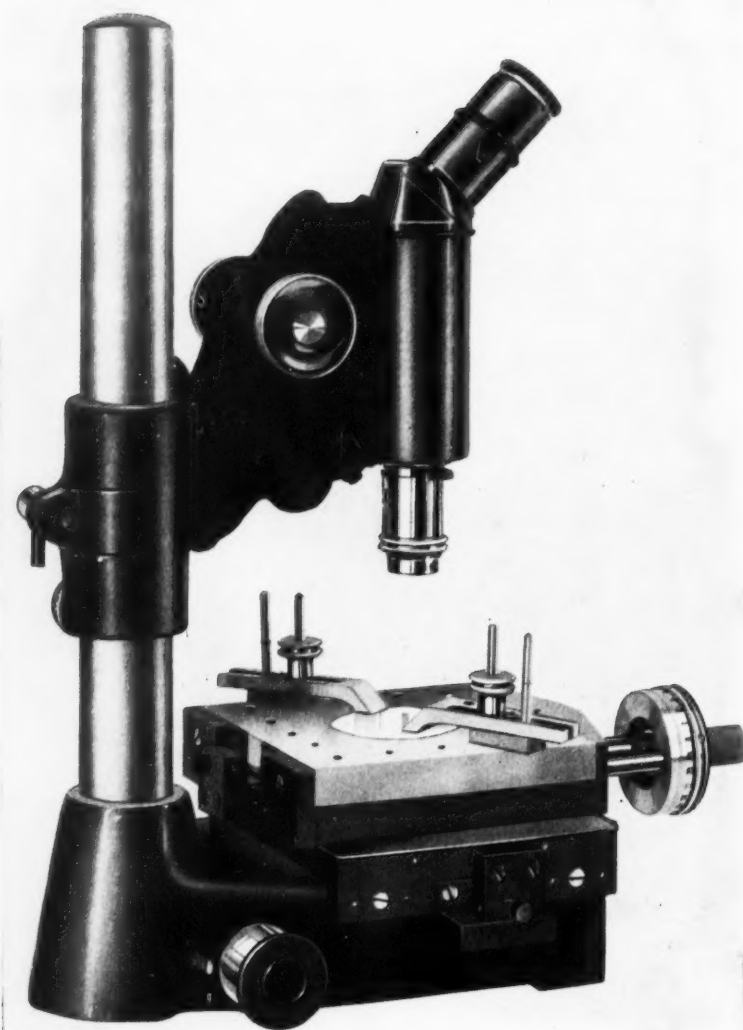
CHARLES H. BESLY AND COMPANY

118-124 NORTH CLINTON STREET



CHICAGO, ILLINOIS

MACHINERY, August, 1937—81



★

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★

OPTICAL methods of inspection and measurement keep production costs in line through exact quality standardization. To meet the special needs of the machinist and toolmaker, Bausch & Lomb has developed a complete line of optical instruments specifically to answer his problems.

From the B & L Toolmaker's Dimensioning Microscope—which is the utmost in precision—to accurately ground watchmaker's glasses, every instrument for the metalworking trade described in the B & L Catalog D-22 is of interest to the practical shopman. This catalog is sent gladly on request. Write Bausch & Lomb Optical Co., 619 St. Paul St., Rochester, N. Y.

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INSURE STANDARDIZED PRODUCTION



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COMPARISON"

And the Original
Radially Ground

COMBINATION
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Regular
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***are* DIRECT HITS!**

Hole Producers from Start to Finish—that will Satisfy. If You are Giving
Consideration to Economy, Specify Cogsdill Drills

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COGSDILL MANUFACTURING CO., Detroit, Mich.

Better

INTERNAL SPLINES

FOR YOU...

LOOK at these sharp, clean-cut splines . . . perfect in contour to the very edge. This splined tube is a good example of the quality of work you can get when you use Texaco Sultex Cutting Oil.

The reason that Sultex gives these results is due to the fact that it lessens friction between the chip and the tool, by getting into the crevice formed between the chip and the work . . . also lengthens tool life.

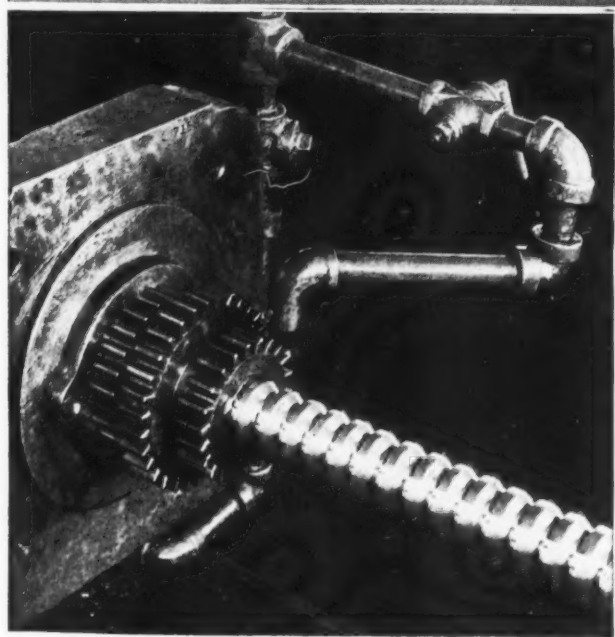
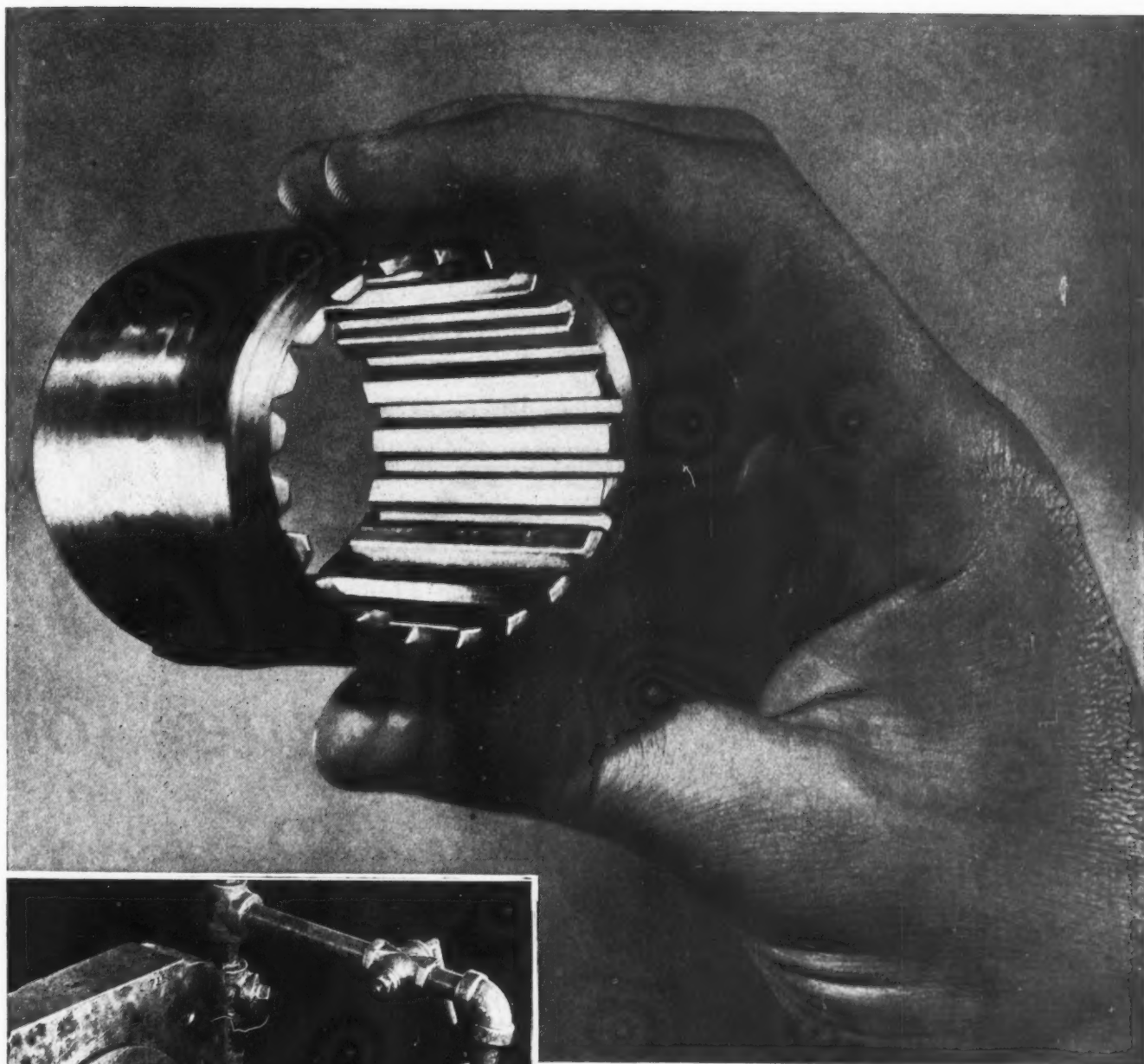
Trained lubrication engineers are available for consultation on the selection and application of Texaco Cutting and Soluble Oils. Prompt deliveries assured through 2070 warehouse plants throughout the United States.

Decide now to have a demonstration of Texaco Sultex and Soluble Oils. It may mean lower machining costs for you, just as it has for hundreds of others.

The Texas Company, 135 East 42nd Street, N. Y. C.



TEXACO



Cutting splined hole in cluster gear . . . a job for Texaco Sultex Cutting Oil.

This splined tube is heat-treated alloy steel 2 1/4" o.d., 1 3/4" i.d., 3 1/4" long, 21 splines. No torn metal and no broken broaches since Texaco Sultex has been used.

TEXACO
SULTEX CUTTING OIL-A
TEXACO
SULTEX CUTTING OIL-B
TEXACO
SULTEX CUTTING OIL-A-2
TEXACO
SULTEX CUTTING OIL-A-4
TEXACO SOLUBLE OIL-C

Sultex & Soluble Oils

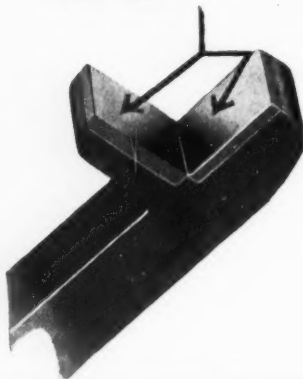
MACHINERY, August, 1937—85



R AND L **TURNING** **TOOL**

Better for *3 Reasons*

Tantalum Carbide Faces on the R and L Backrest act as a burnisher, making it impossible to pick up metal and mar the surface of the work with scratches or blisters. This replaces Rollers and Roller Shafts, avoiding misalignment due to Roller wear, and works especially well on stainless steel and other tough alloys.



The R & L is a new—a better turning tool. Better in three ways that mean real economies for you.

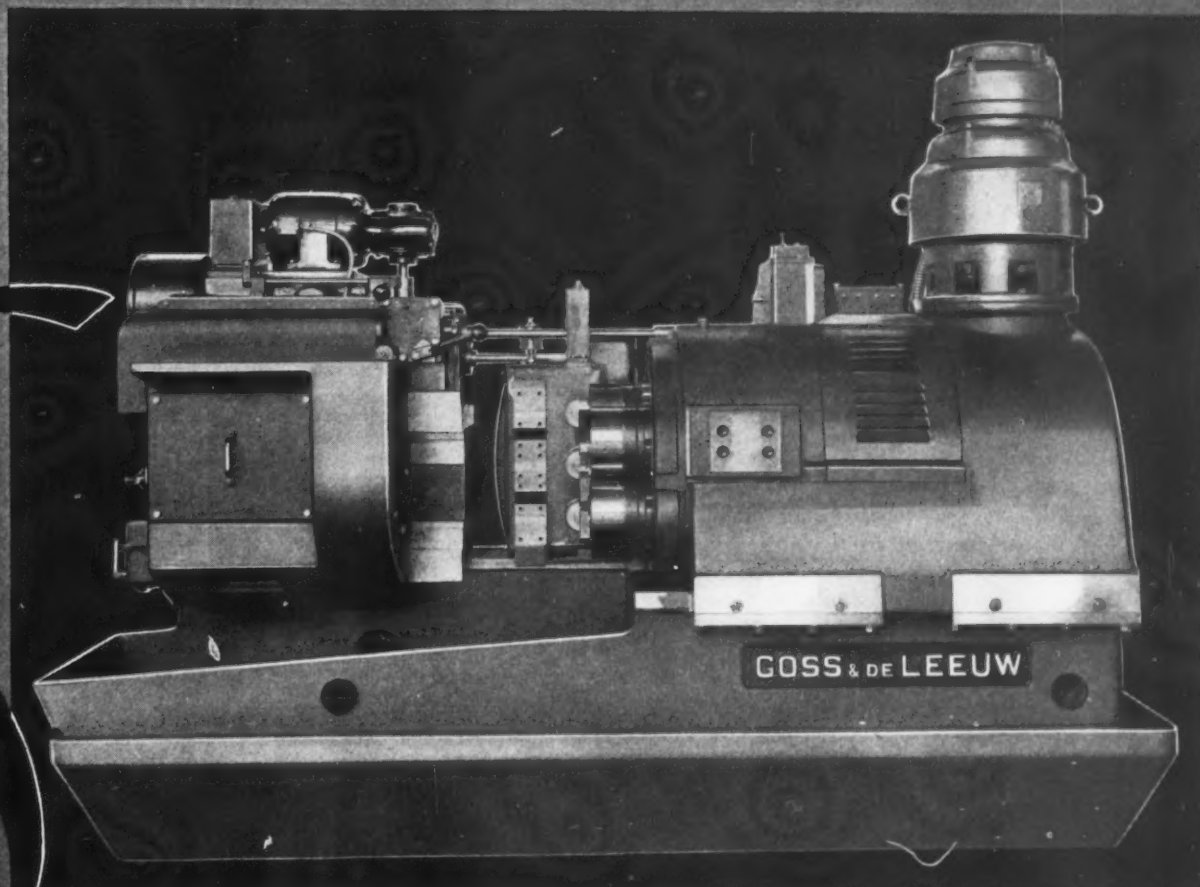
1—FIRST COST. The R & L saves you over \$200 in first cost alone, compared with separate and more costly tools required to do similar work.

2—TIME. The R & L is adaptable to many different jobs, saving time in setting up work. You save in operation time too, for the R & L can do, if necessary, three jobs at once. Above you see the R & L set for drilling, turning and burnishing in one operation.

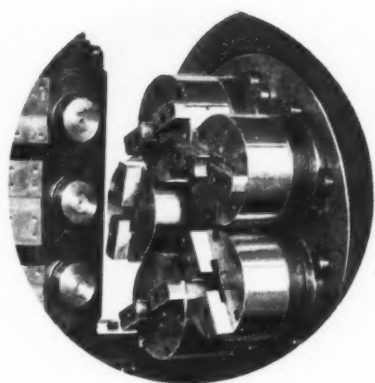
3—MAINTENANCE. Because the R & L is simply designed, with a minimum of wearing parts, it reduces maintenance costs. For *triple-barreled* savings, R & L is the tool for you! Send for our new booklet for further details.

R AND L TOOLS

1825 BRISTOL ST., NICETOWN, PHILADELPHIA, PA.



KINNER ***of course!***

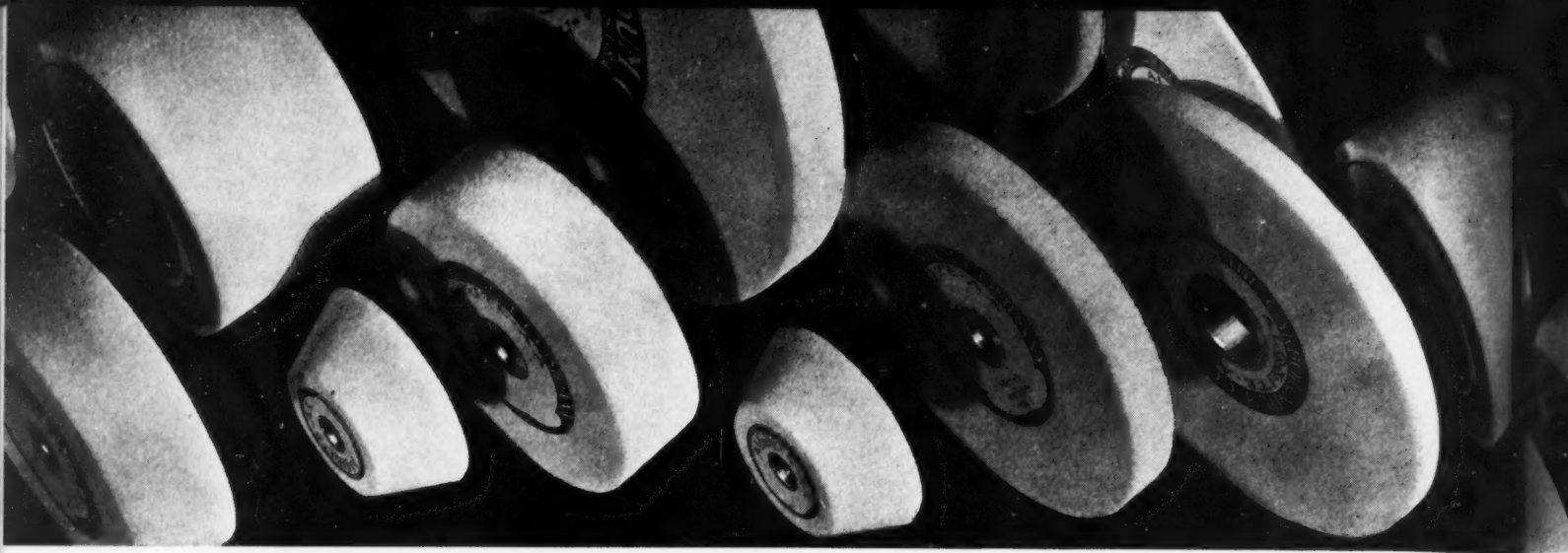


Here's an unbeatable combination for speed and power . . . the new Goss & De Leeuw Multiple Spindle Chucking Machine—and its nest of five Skinner Chucks. These Skinner Chucks are built to take any load with a fast, sure grip, under any production pace. Weight and strength—efficiency and dependability are inherent in these Skinner Chucks. Holding power is more than ample for any set-up. As demonstrated by the choice for this machine, the safe Chuck specification is—Skinner, of course!

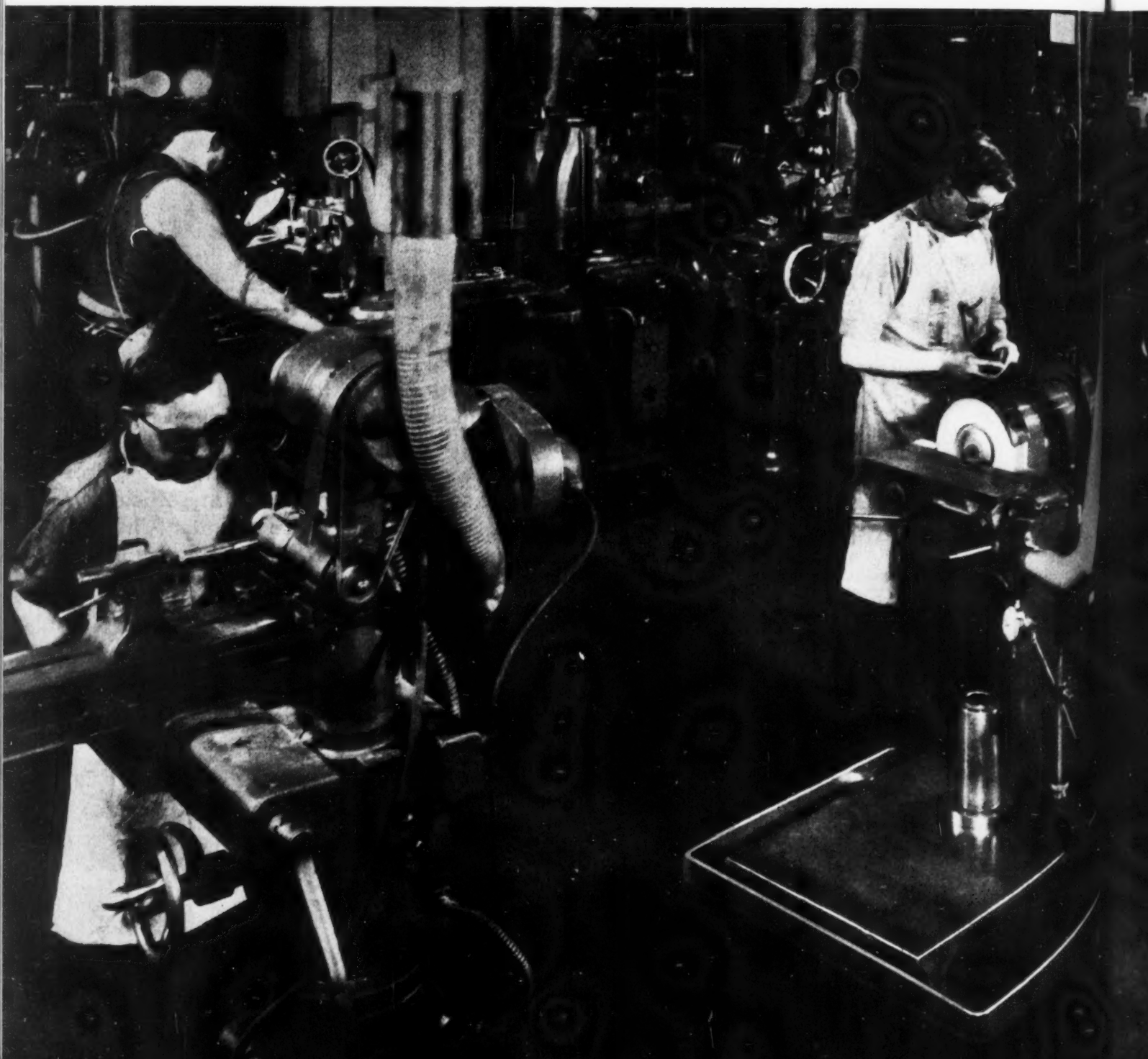
**LATHE—DRILL AND
PLANER CHUCKS
VISES—POWER CHUCKS**



S **KINNER**
CHUCK CO.
NEW BRITAIN, CONN.



In tool rooms like this..





wheels by Carborundum

REG. U. S. PAT. OFF.

The right grinding wheel for every job

• GRINDING out a new chapter in the history of tool room practice are the Aloxite Brand Aluminum Oxide "AA" Wheels and also the mighty successful "270" Bond Wheels. The "AA"—the White Wheels—are for your more precise, particular jobs on special tools. These clean, free, and cool cutting wheels are decidedly flexible in their application. They have the ability to take light or heavy cuts over wide areas of contact with the same free cutting action, and they are adaptable to the grinding of a wide variety of steels. In the "270" Bond Wheel you have much the same properties, combined with certain qualities which make it the perfect high production wheel for duplicated work.

Then of course when it comes to the grinding and conditioning of cemented carbide tools you have but to remember the success of Carborundum Brand Green-Grit Silicon Carbide Wheels and the Carborundum Brand Diamond Wheels. Send for interesting informative books "A Treatise on Tool Room Grinding" and "A Treatise on Grinding of Cemented Carbides". Both will be sent free.

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REG. U. S. BRAND PAT. OFF.
ABRASIVE PRODUCTS

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Niagara Falls, N. Y.

Sales Offices and Warehouses in New York, Chicago, Boston, Philadelphia, Cleveland, Detroit, Cincinnati, Pittsburgh, Grand Rapids
(Carborundum and Aloxite are registered trade-marks of The Carborundum Company)



THEY PAY THEIR OWN WAY



CASE STUDY No. 167

Name of Company ~~XXXXXXXXXX~~ *

Address ~~XXXXXXXXXX~~

Number and rating of National Acme Screw Machines on this job 2 3 1/2-inch Model R-4 spindles

Name of parts being produced Drive pulley for refrigerator V belt

Production rate Higher than estimates

Down time Negligible

Finish and accuracy Excellent-concentricity extremely good, which means an elimination of vibration

Maintenance cost Negligible

Are secondary operations eliminated? Yes - on shaving groove for finish

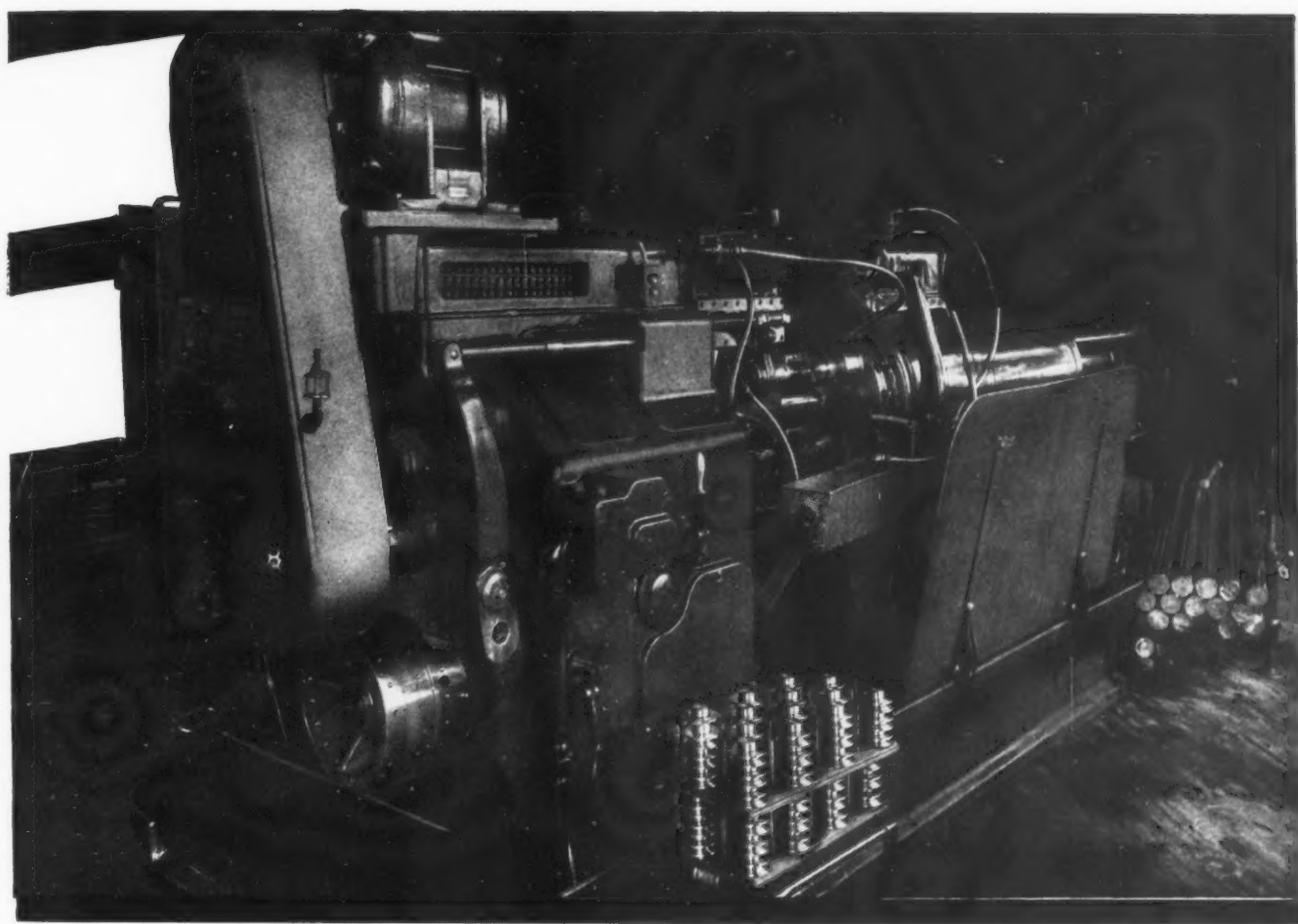
Other advantages of National Acme machines on this job. This part was formerly a casting. It is now made better and cheaper on these automatics.

How long will it take the new machines to pay for the original investment? Approximately one year

Signed M. D. Y.

Automatic Screw
Machines
Dies and Taps
Positive Centrifuges
The Chronolog
Contract Manufacturing

NATIONAL



Refrigerator Manufacturer Saves With New Acme-Gridley Screw Machines

Want greater production? Lower production costs? You can achieve those results with our new Model R National Acme Automatic Screw Machines. That's what a refrigerator manufacturer did (see opposite page.) That's what dozens of other companies are doing today.

We have made amazing improvements in our automatics in the last few years. Improvements so great that they obsolete machines that are comparatively young.

The new models are high-speed heavy machines with little or no vibration. Power is increased. Indexing is faster. Secondary operations are eliminated. More accurate finishes are possible.

No wonder huge savings are made. No wonder this refrigerator manufacturer says the new machines will pay for themselves in a year.

Why not let one of our engineers look over your

equipment—give you dollars-and-cents estimates of costs and savings?

The National Acme Company, Cleveland, Ohio



REG. U. S. PAT. OFF.

What Is the Chronolog?

The Chronolog is the only instrument that keeps a running record of idle and productive time, and a count of pieces on the job—and prints this data on a chart that may be read as easily as a typewritten report. By showing reasons for down time it points the way to their correction. Write for bulletins.

ACME

GRIDLEY AUTOMATICS

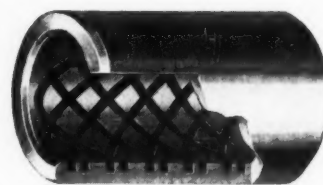
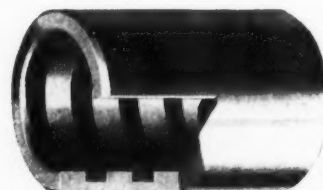
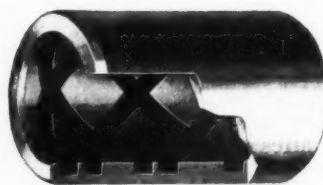
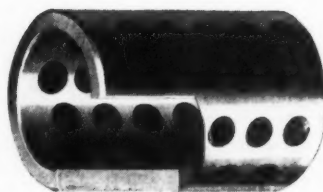


WHEN you buy Graphited Oil-less Bearings make sure that the bearing is properly designed or you may get less than the performance you expect.

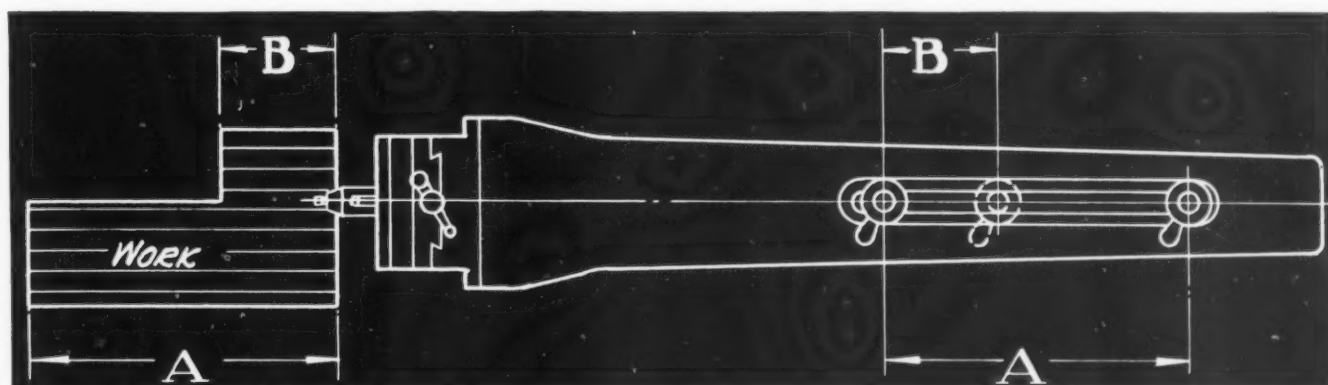
Graphited Oil-less Bearings should be designed and made exactly to meet the requirements of the application under consideration. The style of grooving employed for the graphite composition, the apportionment of bearing contact surfaces (bronze to graphite), are points that have everything to do with the service rendered by the bearing.

Bunting engineering makes it possible to extend the use of this type of bearing to many new applications. Flanged Bushings and Thrust Washers of any size or design also can be obtained in Bunting Graphited Bronze.

We will gladly aid you, without cost or obligation, in making up specifications for Graphited Oil-less Bearings and quote you on such requirements. The Bunting Brass & Bronze Company, Toledo, Ohio . . . Branches and Warehouses in all Principal Cities.



BUNTING  **Quality**
BRONZE BUSHINGS • BEARINGS
MACHINED AND CENTERED BRONZE BARS
BABBITT METALS

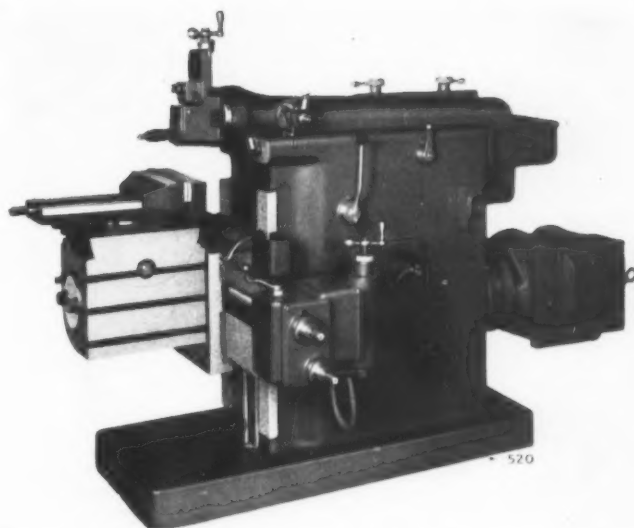


Cut Air? Not With Hy-Draulic Shapers!

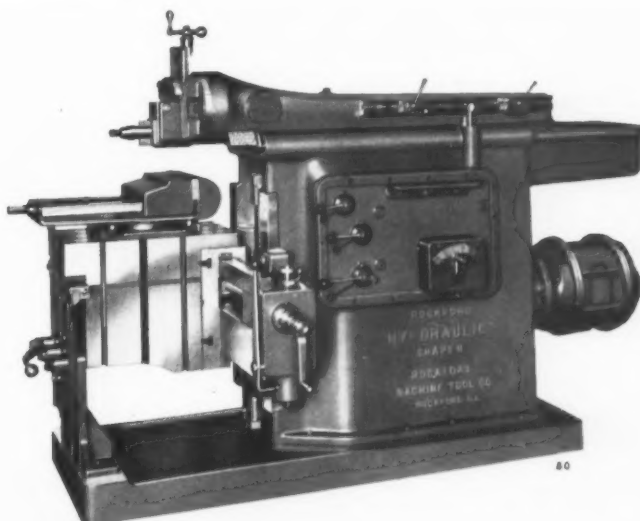
On Hy-Draulic Shapers it is so easy to change the ram-stroke length and its position relative to the work that there is no good reason or excuse for "cutting air". In the diagram above, let dimension "A" on a piece of shaper work be close to maximum stroke-length, and dimension "B" much less. To change a mechanical-drive shaper from stroke "A" to stroke "B" involves unclamping, cranking, and re-clamping; also the possibility of cutting off power or "inching" the ram, gear shifting and altering the finish of the surface machined. Changing the position of the ram-stroke as well as its length adds more experimental work.

To change the Hy-Draulic Shaper from stroke "A" to stroke "B", the operator merely loosens a stop by hand, slides it to desired position, tightens it—and that's all. No tools needed, no cranking, no stopping or "inching" the ram, no change in cutting speed—and no change in the finish of the surface machined because the Hy-Draulic cutting pressure is constant and uniform throughout the stroke regardless of length. It is equally easy to alter the position of the Hy-Draulic Shaper ram-stroke with reference to the work.

Mentioned above is one of many exclusive operating advantages of Hy-Draulic Shapers which increase production and cut costs. These machines have many other basic features of design and construction which increase the amount of metal removed per minute and per horse-power, in comparison with shapers having rigidly connected mechanical drives, lengthen tool-life, and improve quality of finish. Investigate before you place your next order for shapers. Write for Bulletins today.



Above—12" High Speed Hy-Draulic Shaper. See Bulletin H.S.-8 for details.



Above—Hy-Draulic Ram-type Shapers are made in six larger sizes. See Bulletin H.S.-4.

Hy-Draulic

Shapers · Shaper-Planers · Planers
ROCKFORD MACHINE TOOL CO.
 ROCKFORD, ILLINOIS, U. S. A.

MADE IN ROCKFORD, ILLINOIS, U. S. A.



ENGINEERED PRODUCTION

EXAMPLES FROM THE SUNDSTRAND FILES

No. 3721

Lathes
Milling Machines
Tool Grinders
Centering Machines
Balancing Tools

Turning Tapered Valve Plugs On Model 10 Automatic Stub Lathe

Roughing and finishing operations on 12 sizes of tapered valve plugs are performed accurately and economically by the Sundstrand Automatic Stub Lathe shown in Fig. 2. In the first operation, shown in Fig. 1, machine rough-turns taper, grooves, faces, and turns radius of plugs. Then set-up is changed to

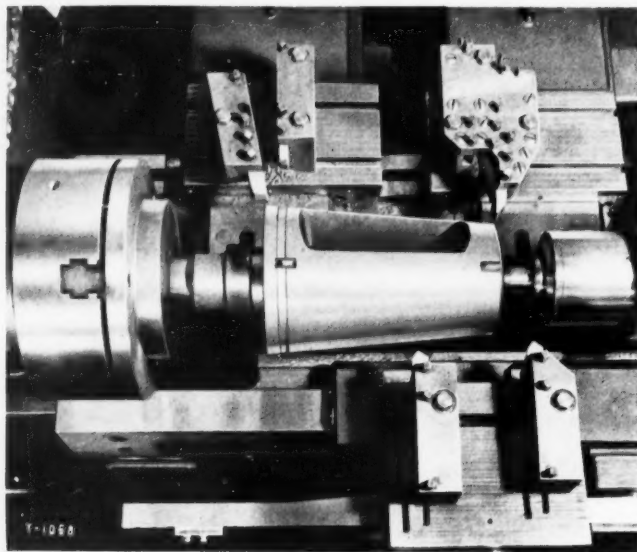


Fig. 1 — Close-up of tooling for turning taper, grooving, facing, and turning radius of tapered valve plug.

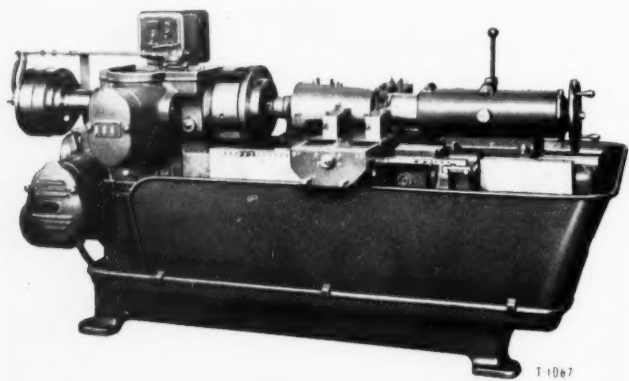


Fig. 2 — Model 10 Stub Lathe with long bed, special headstock and spindle drive for turning tapered plugs.

rough-turn stem, as shown in Fig. 3. The set-ups are then repeated to finish plugs. Sizes range from $4\frac{15}{16}$ " diameter to $11\frac{1}{2}$ " diameter at large end, materials turned are cast iron and steel. Angle of taper is accurately controlled by hardened and ground cam-bar rigidly mounted to machine bed. The

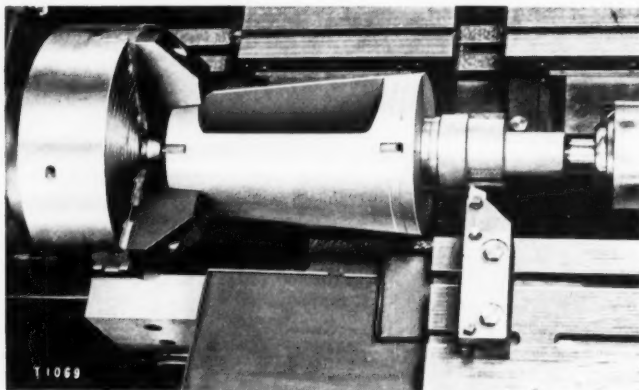


Fig. 3 — Close-up of tooling for turning stem of tapered valve plug.

hardened steel slide-ways and rugged construction of tool carriages insure accuracy and smooth finish throughout, especially on the intermittent taper cut.

Ease of setting up and changing from job to job, automatic operating cycles, simplicity of tooling, and other important features and advantages of Sundstrand Model 10 Lathes reduce costs and increase production wherever these lathes are used.

Applications of Sundstrand Automatic Stub Lathes are not limited to their standard dimensions; machines retaining all the basic operating features, but with longer beds, heavier headstocks, spindle drives and larger tool carriages can be furnished. Investigate. Send drawings and data for engineering recommendations.

SUNDSTRAND MACHINE TOOL CO.
2530 Eleventh Street, ROCKFORD, ILLINOIS, U. S. A.

RIGIDMILS - STUB LATHES

Tool Grinders - Drilling and Centering Machines
Hydraulic Operating Equipment - Special Machinery



MADE IN ROCKFORD, ILLINOIS, U. S. A.

AMERICAN BROACHING



American Broaching Service is complete . . . has nation-wide representation . . . creates machines, broaches, fixtures, separately or as complete units; for any practical broaching operation.



ANNOUNCING Type H Horizontal Hydraulic Broaching Machines

Type H American Horizontal Hydraulic Broaching Machines are built in seven sizes for handling any internal broaching operation, and a variety of surface-broaching operations, within their capacities. These machines are sound in principle, simple in design, high in quality of materials and workmanship. They have features and advantages which increase production, maintain high accuracy, and facilitate operating convenience. Standard hydraulic equipment installed with minimum connections and great care insures reliable operation steadily throughout years of heavy-duty service. Unexcelled

for continuous production of duplicate parts, American Horizontal Hydraulic Broaching Machines also can be set up easily and quickly for short runs on different types of work-pieces.

The long pulling slide, hardened steel ways, automatic pressure lubrication, space-saving arrangement of hydraulic cylinder, convenient controls, and other distinctive features and advantages of five sizes in the group of seven American Type H Horizontal Hydraulic Broaching Machines are described in a new circular that will be sent promptly to interested executives on request. Write for a copy, today.

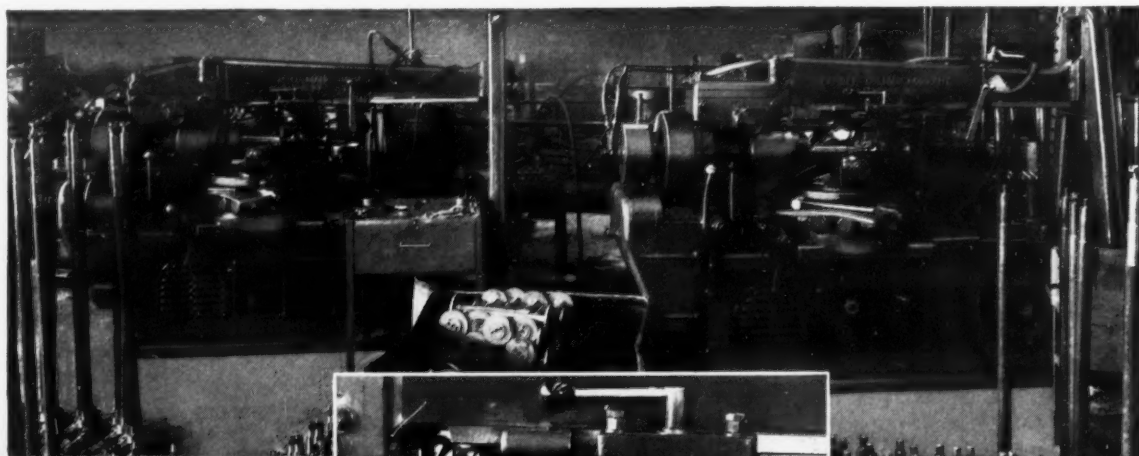
AMERICAN BROACH & MACHINE COMPANY, Ann Arbor, Michigan, U. S. A.

BROACHING MACHINES, PRESSES, BROACHING TOOLS, SPECIAL MACHINERY

A Division of
SUNDSTRAND MACHINE TOOL CO. ROCKFORD, ILLINOIS, U. S. A.

Machinery—August, 1937

Taper Splines FOR Safe Steering



Close-up at left shows hobbing of taper spline on end of steering-knuckle spindle shown below. Metal machined is 1045 steel, averaging 263 Brinell. Taper spline is 1.34" long on 1 1/2" diameter, key width tolerance is .002". Barber-Colman Ground Hobs are used.

Shown above is a heavy-duty double steering knuckle with spindle, a close-up of the Type T set-up for hobbing the taper splines on the spindle, and part of the Barber-Colman Hobbing Machine installation in the plant where these steering knuckles are produced. In assembling, a segment is mounted on the end of the 46" steering-knuckle spindle. A 6-key taper spline was selected as the method of mounting the segment because the taper spline gives greater strength and contact area than other methods; provides a solid seat and metal-to-metal contact, is easily, accurately, and economically produced on the Type T Hobbing Machine; is notably reliable as a mounting means especially for vital parts in heavy-duty service. The Type T Hobbing Machine provides high production, maintains accuracy well within required limits—and can be used on ordinary straight or helical hobbing at any time if desired. Barber-Colman Ground Hobs are used on this job, as they are on many others where maximum accuracy, production, and economy are required.

For the latest and best means of mounting machine members on shaft-ends, investigate the taper spline and Barber-Colman Type T Hobbing Machine. Write for details today.



MILLING CUTTERS,
HOBS, HOBGING
MACHINES, HOB
SHARPENING MA-
CHINES, REAMERS,
REAMER SHARP-
ENING MACHINES,
SPECIAL TOOLS

BARBER-COLMAN COMPANY

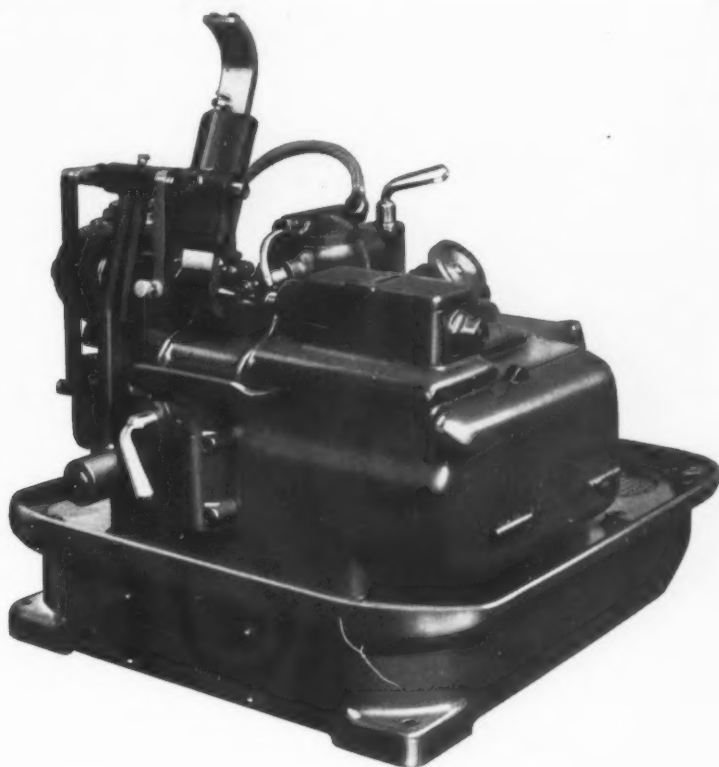
General Offices and Plant ROCKFORD, ILLINOIS, U. S. A.

MADE IN ROCKFORD, ILLINOIS, U. S. A.

RECEIVED—AUGUST, 1957

★
Presenting

Type "S"
the NEW
**BARBER-
COLMAN**



Pinion Hobbing Machine



DEMONSTRATOR ON TOUR

A Barber-Colman hobbing expert is now touring industrial centers demonstrating a full-sized Type S Pinion Hobbing Machine in operation to interested manufacturers. If you have not seen this machine and are interested, wire Barber-Colman Company, Rockford, Illinois for your demonstration.

Applications—For high speed continuous hobbing of spur gears and pinions for small precision instruments such as meters, clocks, watches, cameras, motion picture apparatus and the like which require accurate, smooth and quiet running gearing. Handles work up to 1" diameter by $\frac{1}{2}$ " face of any machinable material from brass to drill rod.

Fully Automatic—Barber-Colman Type S Hobbing Machine operates continuously in an automatic cycle including work-loading, rapid approach to hob, feed, quick return, ejection of work, and repeat. Operator merely keeps the magazine supplied with blanks and, of course, can run other machines. While primarily used as a magazine feed machine Type S can be furnished with hopper feed or as a hand-loaded unit. Adjustments for variations in work are few and simple to make.

A Quality Product—The new Barber-Colman Type S Pinion Hobbing Machine is the result of several years of painstaking research and development work. Excellence of design, materials and workmanship; precision manufacturing methods; relentless inspections all combine to produce a machine that is worthy of the Barber-Colman name, and a machine attuned to the exacting requirements of the precision instruments for which it makes parts.

BARBER-COLMAN COMPANY

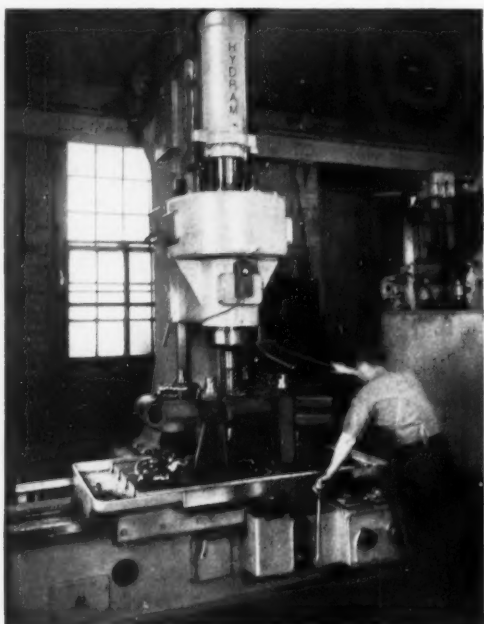
General Offices and Plant ROCKFORD, ILLINOIS, U. S. A.



PRODUCTS

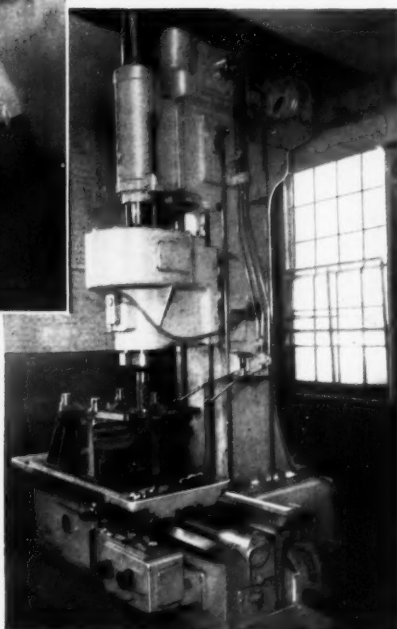
MILLING CUTTERS,
HOBS, HOBGING
MACHINES, HOB
SHARPENING MA-
CHINES, REAMERS,
REAMER SHARP-
ENING MACHINES,
SPECIAL TOOLS

MADE IN ROCKFORD, ILLINOIS, U. S. A.



... and it *Mills*

Shown above is H-4 Hydram rough-boring cast-steel counterweights for oil well rigs. Hole diameters range from $3\frac{7}{8}$ " to $6\frac{1}{2}$ ", all 9" deep. At right is shown finish reaming. The 8 quick-change spindle speeds and infinite adjustments of hydraulic feed are mighty handy here. Then comes a face milling operation in which hydraulic table-feed and rapid traverse are employed. Back facing completes the job, all in one chucking and handling of the heavy work-piece. Unusually interesting installation. Write for details.



Drilling - Boring - Milling

Self-Oiling All-Gear Drilling Machines are built in a large number of sizes and types for drilling, boring, reaming, tapping and similar operations ranging from $\frac{3}{8}$ " to 4" diameter, and for boring certain larger sizes. Well and favorably known to the entire metal-working industry for accuracy, high-productive capacity, and stamina (guts, if you prefer); these machines are particularly suitable for all high production work, for greatest economy on small lot manufacturing, for accuracy and speed in tool room and maintenance work.

Illustrated is our H-4 Hydram. In what other machine will you find such accuracy, power and strength; combined with hydraulic feed directly over the cutting tools and hydraulic feed and rapid traverse to the table? It bores, reams, faces, and mills steel counterweight castings and other work pieces. Our other Drilling Machines are equally suitable for many different types of work.

Honing—For extreme accuracy, finest surface, and highest production on finishing cylinders and other bores, there is no substitute for honing. We build a complete line of Vertical and Horizontal Honers for any bore that can be honed from the largest to the smallest. One of our latest installations is a Horizontal Honer with 25-foot stroke for finishing oil well working barrels, other interesting honing developments now in process.

Investigate—Write today for complete information on our Drilling and Honing Machines. Ask for Catalog M.

BARNES DRILL CO.
814 Chestnut Street
ROCKFORD, ILLINOIS



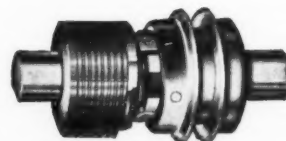
The Pullmore BLUE BOOK Shows Pullmore Installations in Leading Industrial Products

New Booklet, now available, contains complete information on sizes, dimensions and capacities of Pullmore Clutches; drawings of typical applications; 20 illustrations of equipment using Pullmore Clutches; brief information on Rockford O-C Toggle-Type and Spring-Loaded Clutches. Here is a useful handbook for engineers, designers, purchasing agents and others responsible for reliable, efficient, low-cost power transmission and control. Write for a free copy today.

Pullmore Multiple Disc Clutches—Pullmore Clutches are made in single and double types, for operation in oil or dry, in capacities from 1 h.p. to 75 h.p. at 500 r.p.m. They are used as main drive clutches carrying all the load; as auxiliary clutches controlling individual units; and in power take-off mechanisms to operate various attachments. Pullmore Clutches engage smoothly, easily, operate efficiently over long periods without attention. Adjustment can be made easily and quickly when this eventually becomes necessary.



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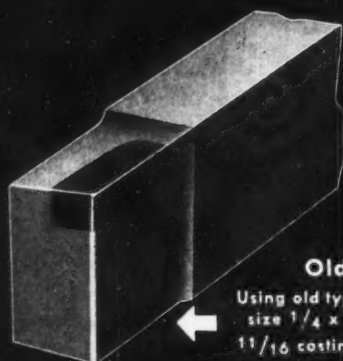


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ROCKFORD DRILLING MACHINE DIVISION
of Borg-Warner Corporation 310 Catherine Street, Rockford, Illinois, U. S. A.
Sold by Morse Chain Company, Ithaca, New York With offices in principal cities

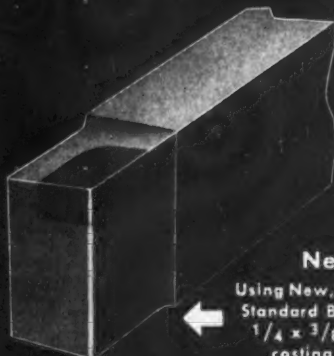
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This Simple Change In Tip Design Saves You \$.95 On This Carboloy Tool



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Using old type blank
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Standard Blank size
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Tools Are Size
 $5/8 \times 1-1/4$, For the
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Are Identical Except
For Carboloy
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The 3 Styles of Lower-Priced
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Available in 152 sizes adapt-
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CEMENTED CARBIDE TOOLS

CARBOLOY CO., INC.
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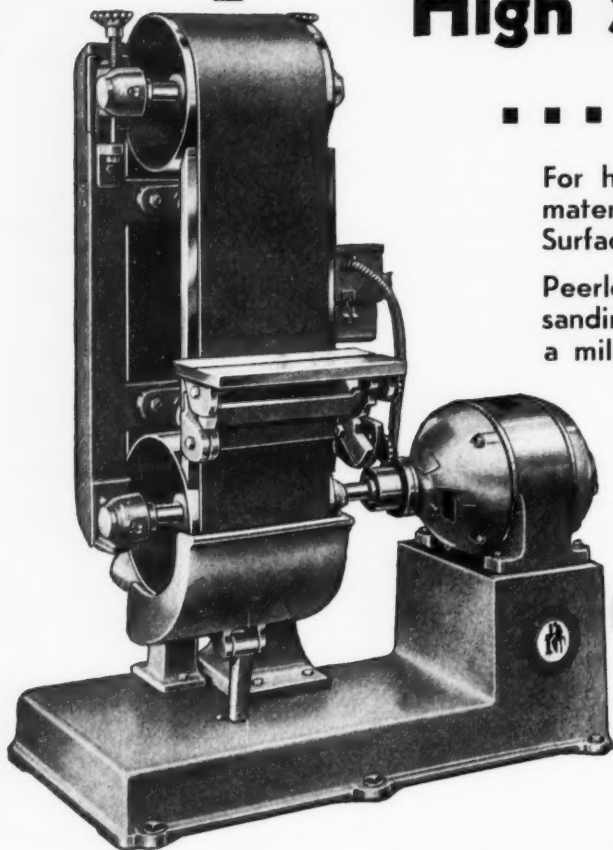
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For high speed finishing of flat surfaces—on any material that can be polished or ground—Peerless Surfacing Machines keep costs in low gear!

Peerless Machines eliminate costly hand filing and sanding. A rapid cut may even take the place of a milling or planing operation.

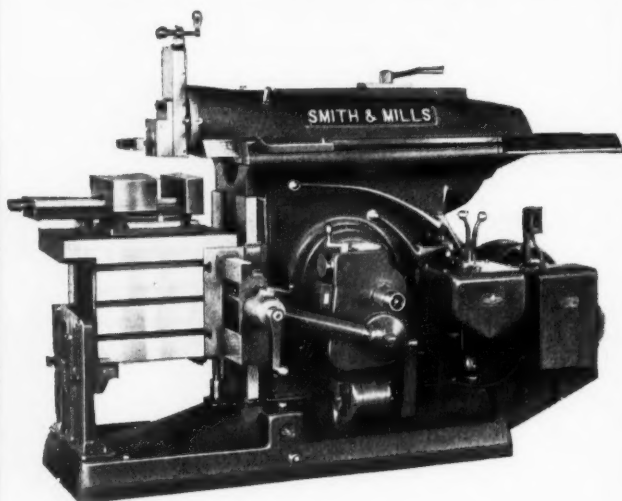
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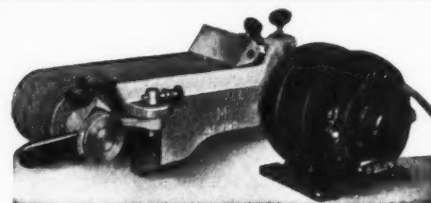


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OLIVER DRILLPOINTERS ASSURE ACCURATE, UNIFORM, FREE CUTTING DRILLPOINTS.

Cutters sharpened on the Oliver Universal Tool and Cutter Grinder have a keen cutting edge and the proper amount of clearance to permit maximum feeds and speeds.

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For grinding all types of cutters, reamers, spot facers, end mills, formed cutters, face mills, side mills, etc. Easy to set up—easy to operate—fast and accurate on all operations. A life saver for your cutters and reamers.



Right—The Oliver Drillpointer

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Hundreds of These Machines

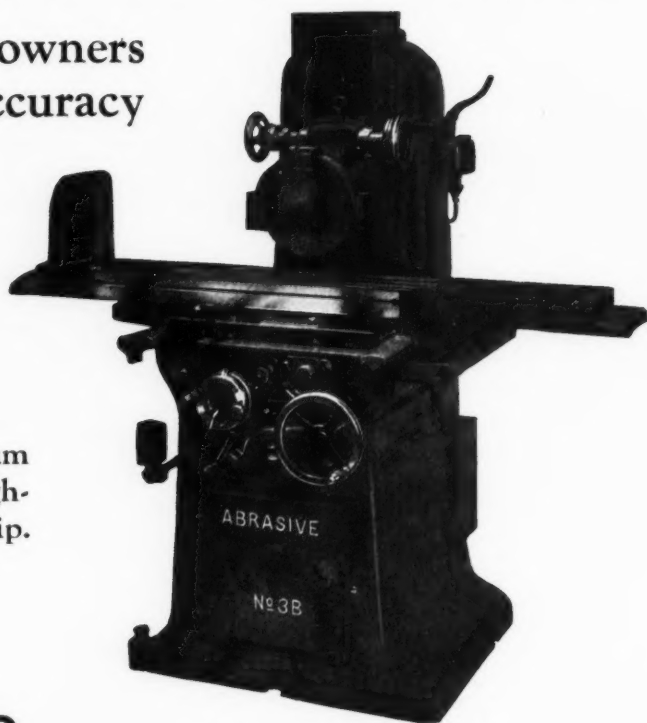
are daily producing for the owners surfaces of unsurpassable accuracy and finish.

These sturdy surface grinders will remove stock just as fast as any horizontal spindle surface grinder in the world powered with a three-horse-power motor.

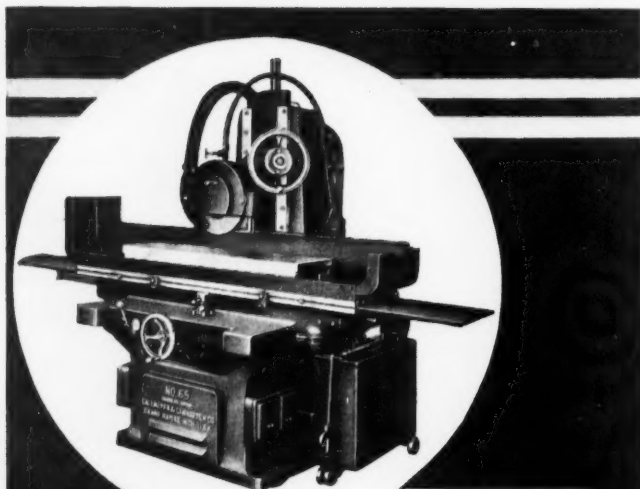
Sturdiest possible construction—minimum friction losses—utmost precision and highest quality of materials and workmanship.

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8" x 24" x 12"
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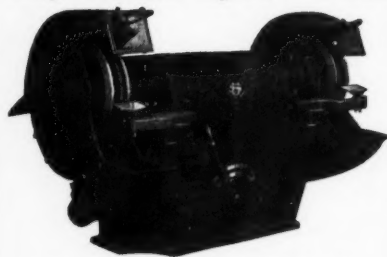
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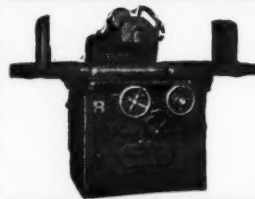


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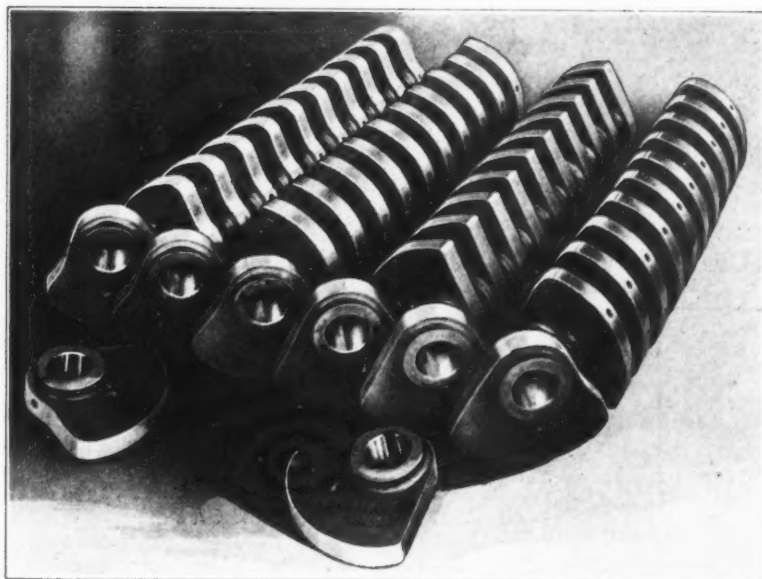
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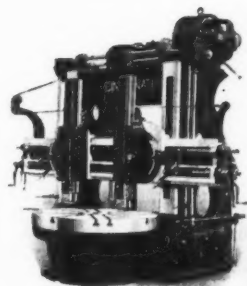
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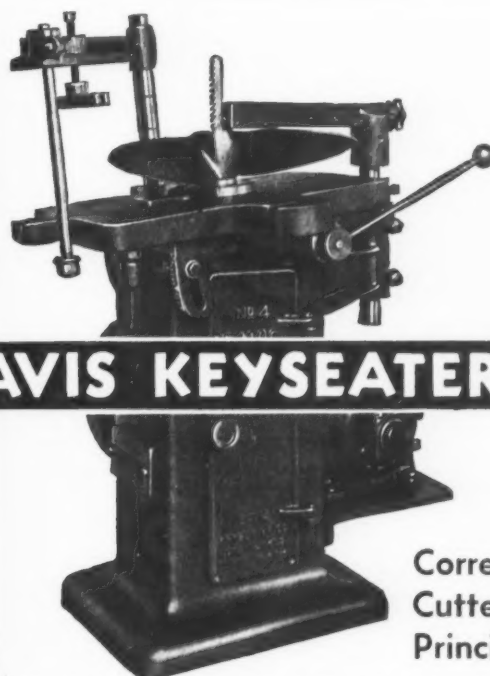
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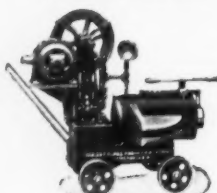
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**Correct
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Principle**

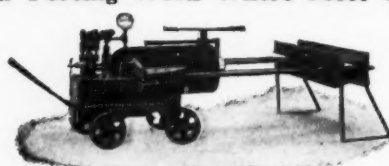
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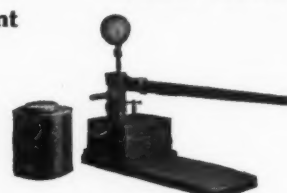
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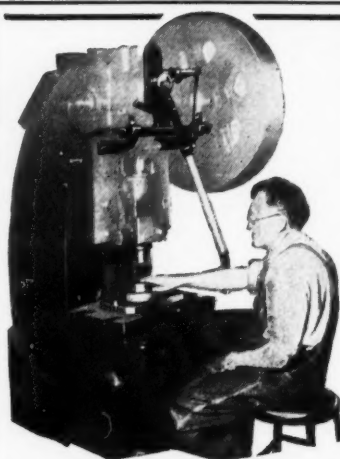


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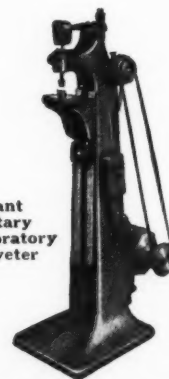
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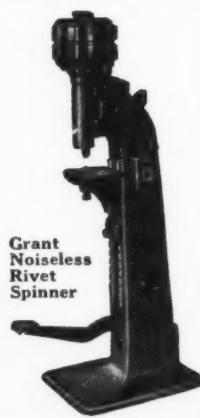
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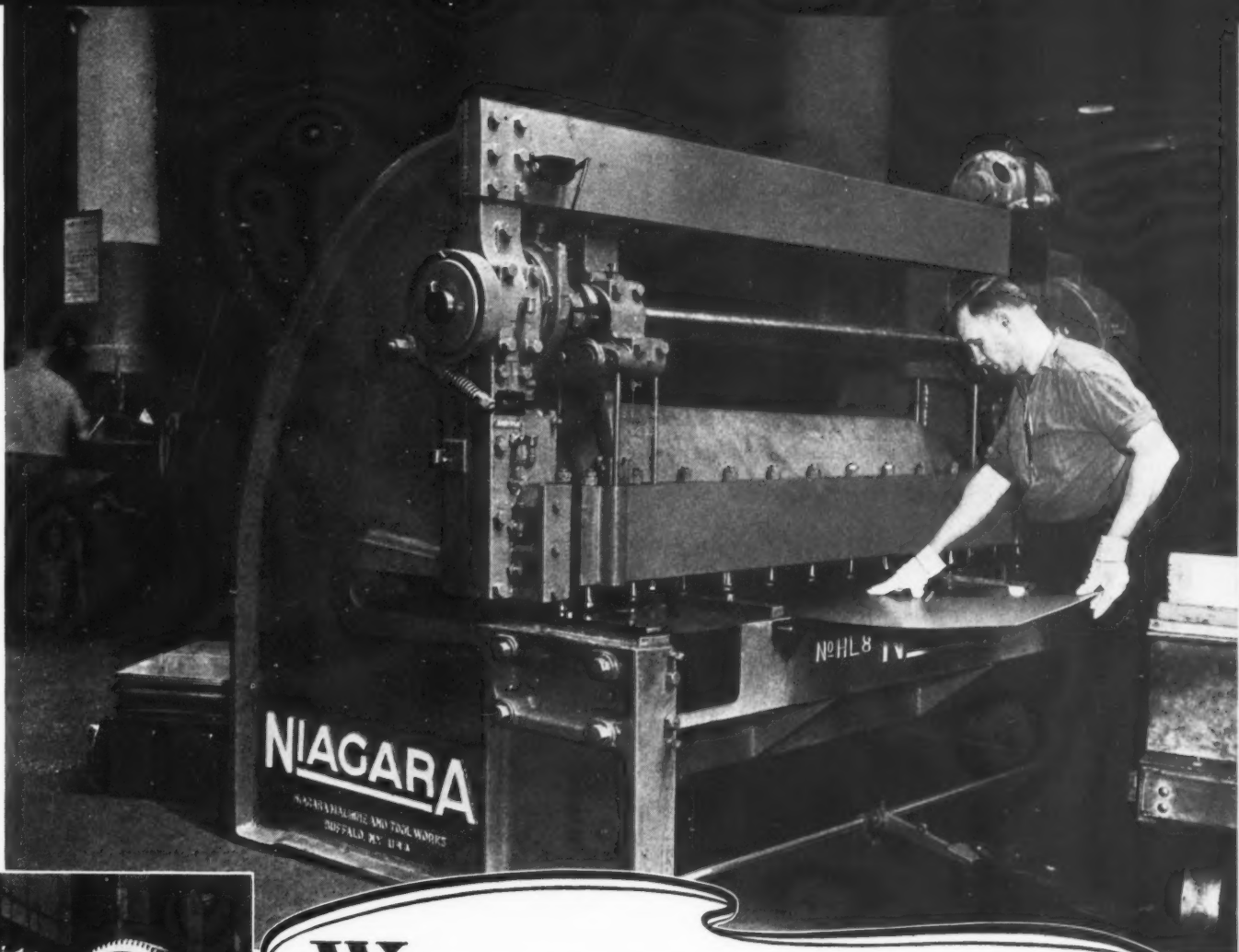
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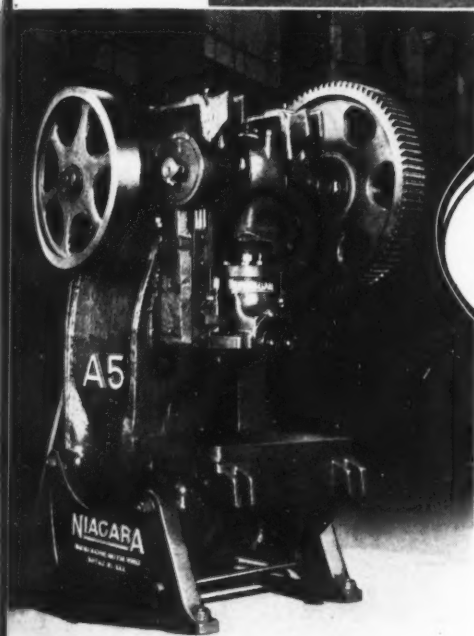
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Showing Niagara Series HL Power Squaring Shear in action in one of the plants of one of America's largest automotive manufacturers.



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Men responsible for production costs, operation and maintenance are saying many fine things about the latest type Niagara Presses and Shears. Their statements are the result of their own actual experience . . . and the experience that Niagara builds into them.

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Frames are designed for strength and rigidity horizontally, vertically and torsionally.

Adequate bearing surfaces and other related design features result in long die life on Niagara Presses and accurate cutting with Niagara Shears.

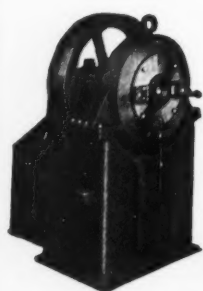
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All explained in booklet—"The Torrington Swaging Machine"—Your copy mailed on request.

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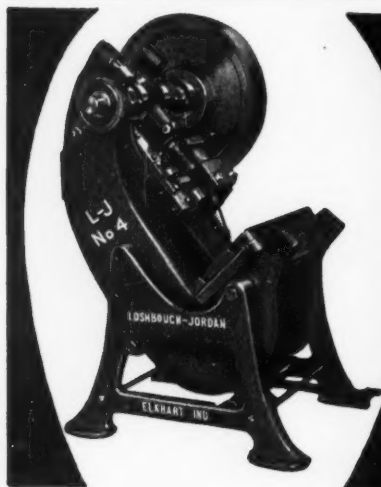
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May we send you our catalogs which give the specifications of these cylinders?

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For Chucked and Centered Work.

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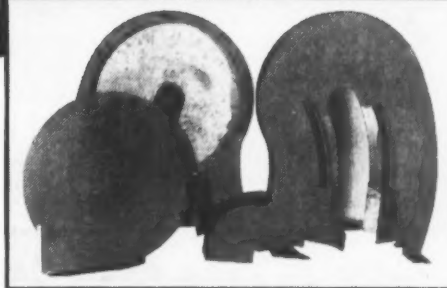
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here's a typical job on which "nibbling" saves time and money



These parts for machine guard were "nibbled" to shape at rate of 24 inches per minute.



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If you cut metal or any commercial materials—

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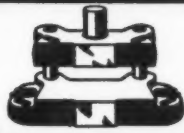
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Machined Steel

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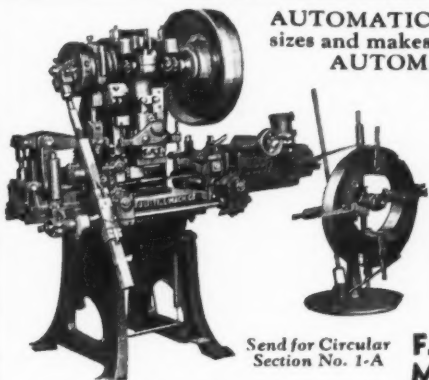
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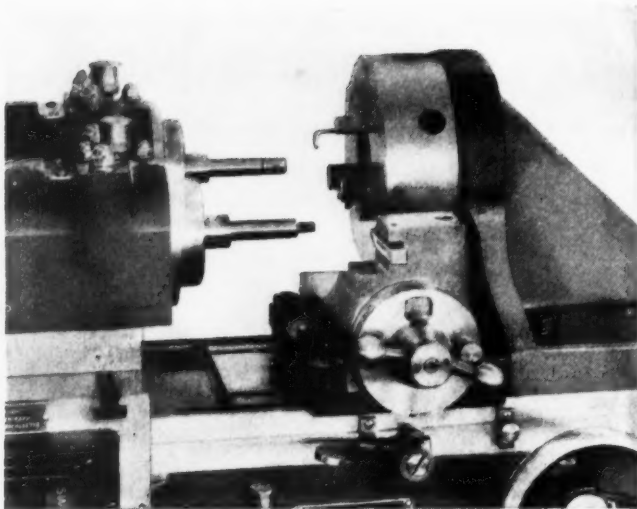
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PUNCH PRESS AIR VALVES and UNIVERSAL AIR NOZZLES for the safe and quick ejection of work pieces.

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Punch Press Equipped with a Littell No. 3 Rack and Pinion Roll Feed, Straightener, Oiler, Scrap Cutter, and No. 3 Reel.



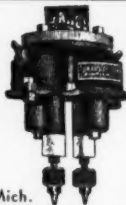
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TAPPING HEADS
Fixed center & adjustable with ball-bearing construction. Send for catalogue.



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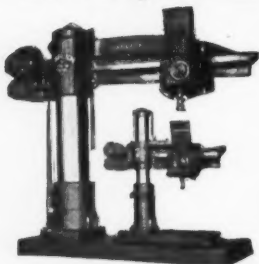
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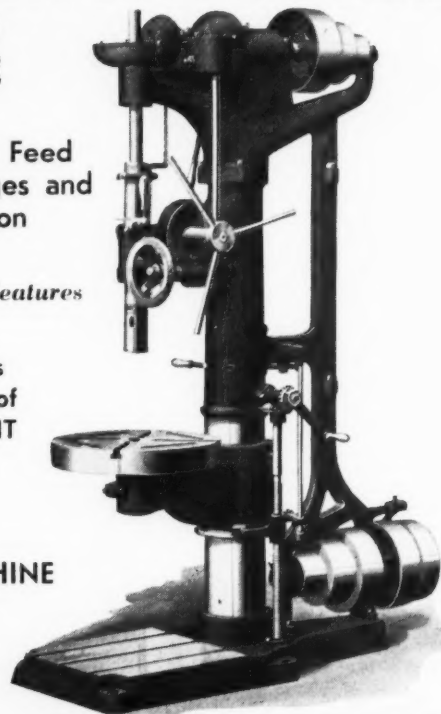
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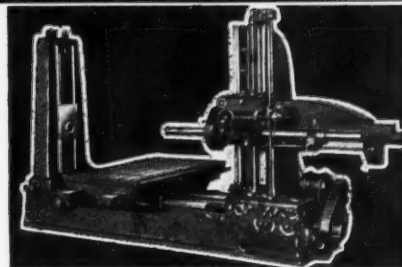
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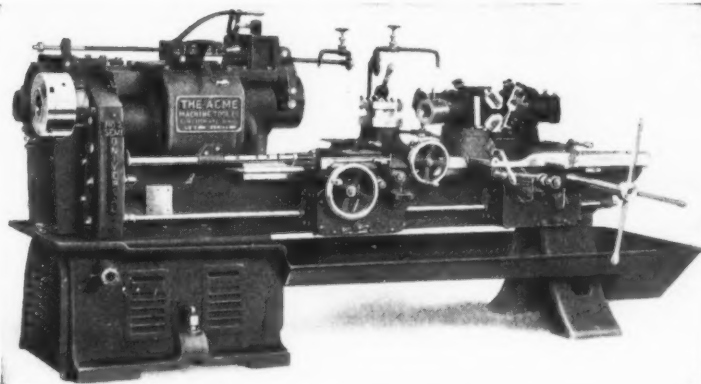
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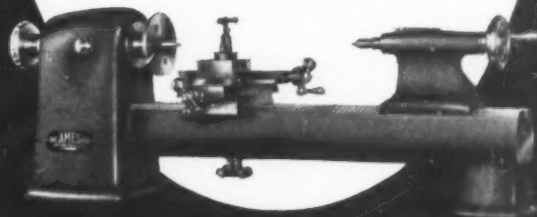
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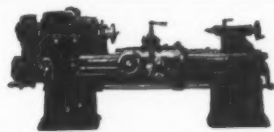
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Improved High Duty Metal Sawing Machine

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Hydraulically
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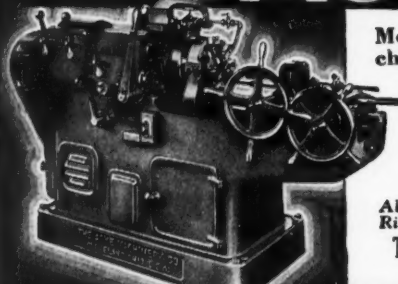
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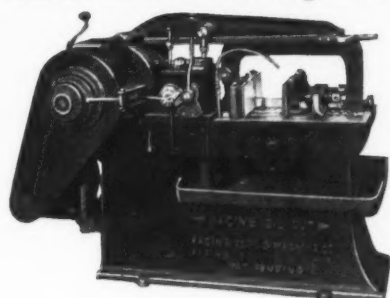


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6' x 6"
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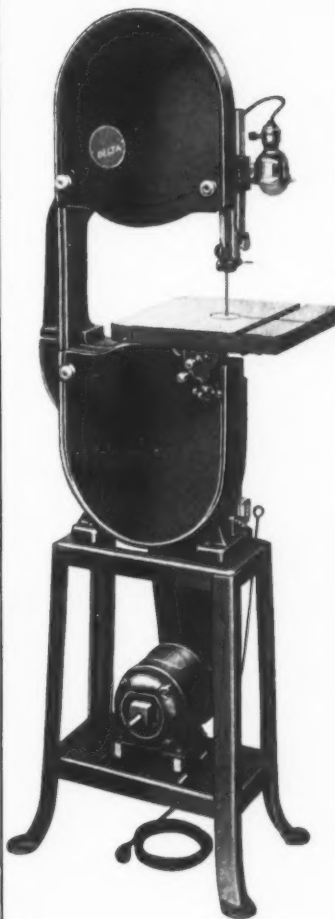


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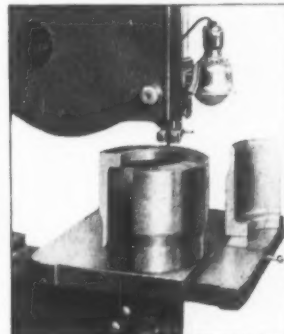
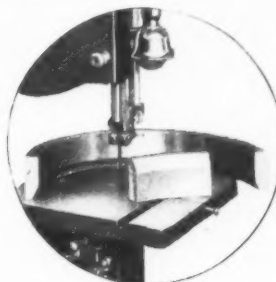
It will "double in wood," too, by a simple change of belts, as provision is made for four low metal-cutting speeds and one high speed for wood sawing.

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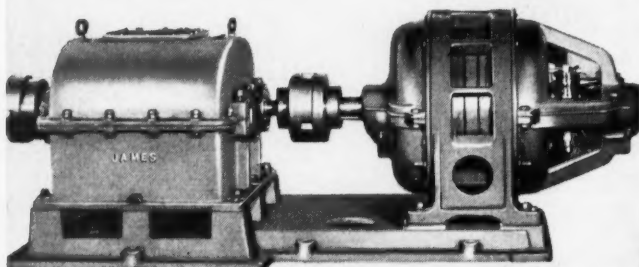


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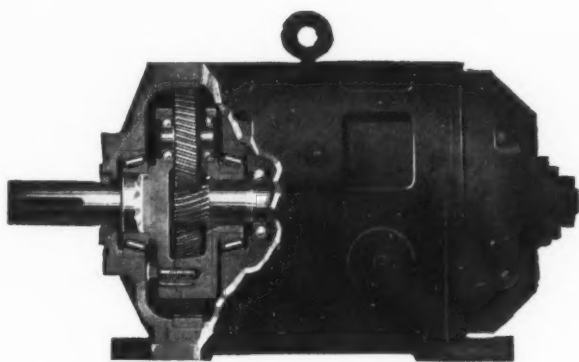
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A cutaway view of HS Open Type MotoReduceR

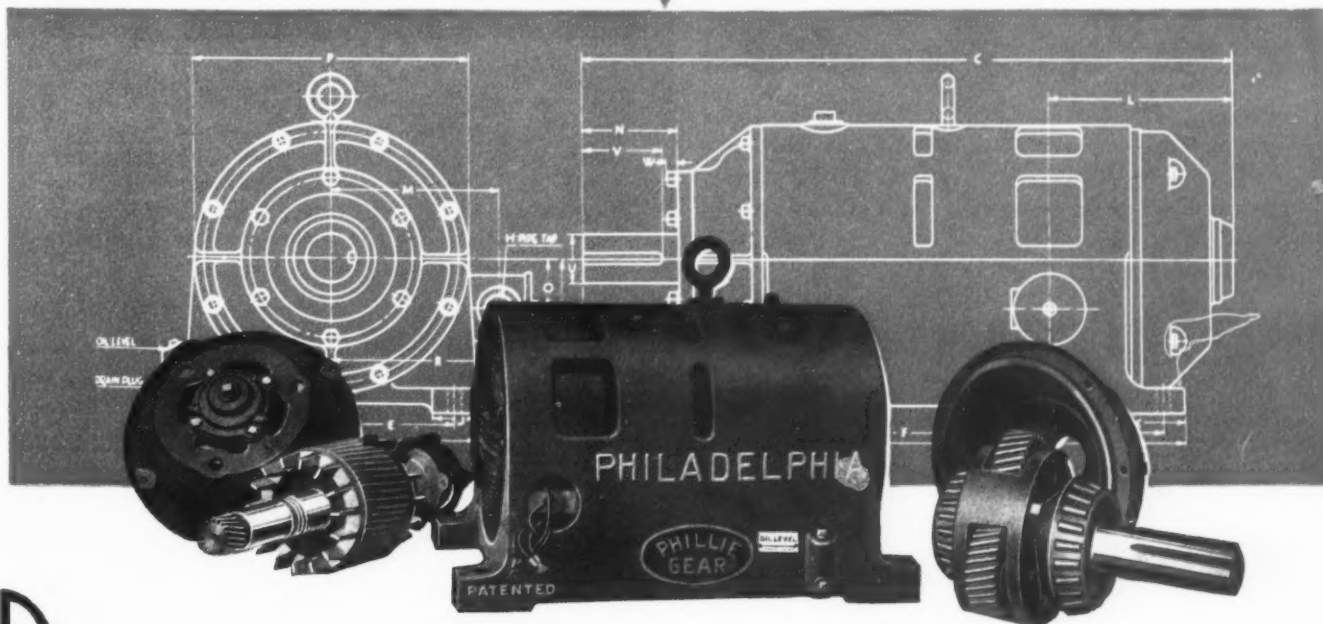
Not over 5 years ago, the idea of an efficient, compact, self-contained combination of Motor and Speed Reduction Unit was treated lightly by industrial buyers, and, no doubt, rightly so. But during that time our engineers experimented, designed and developed the well-known Philadelphia MotoReduceR which, today, is used by

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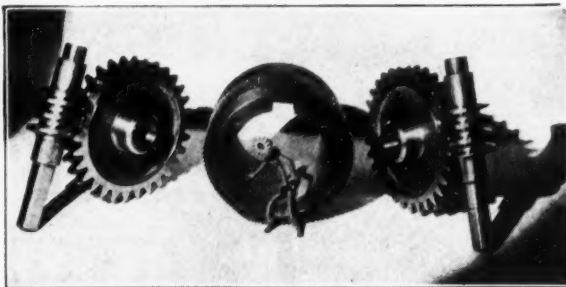
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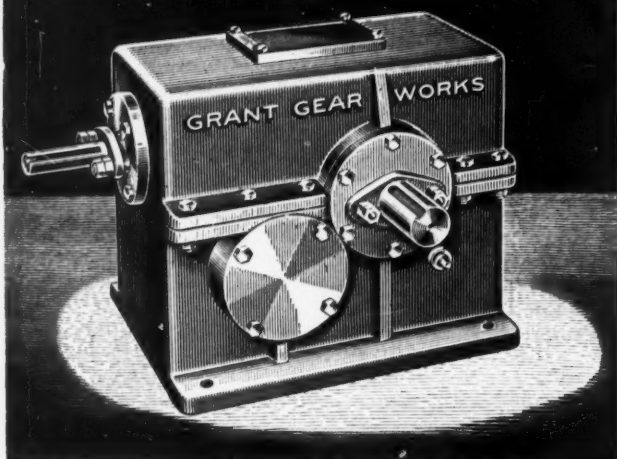
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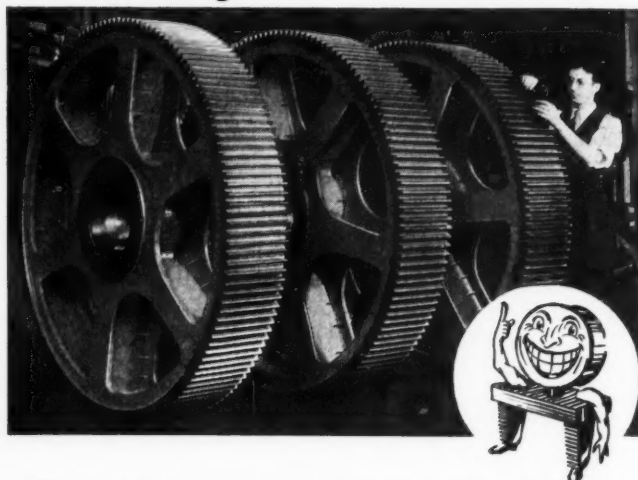
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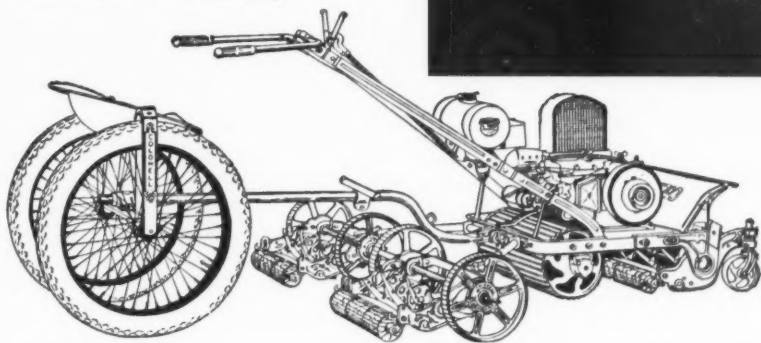
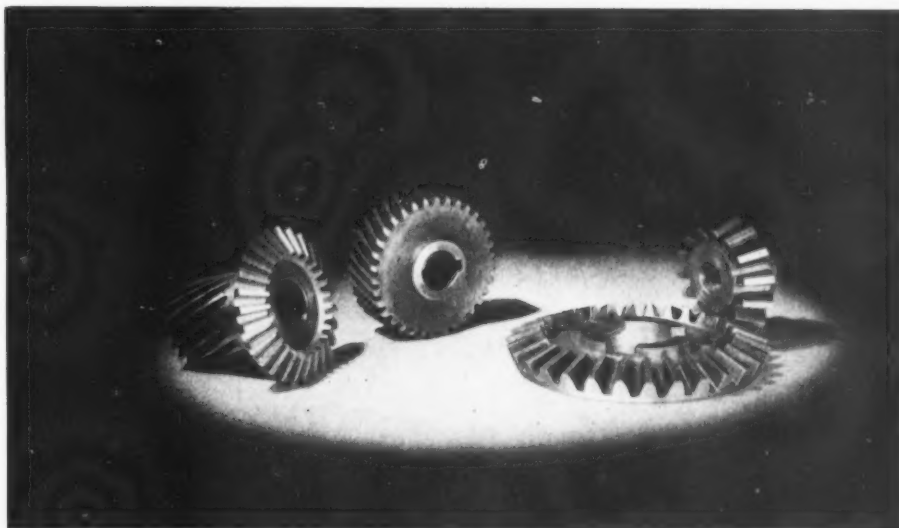
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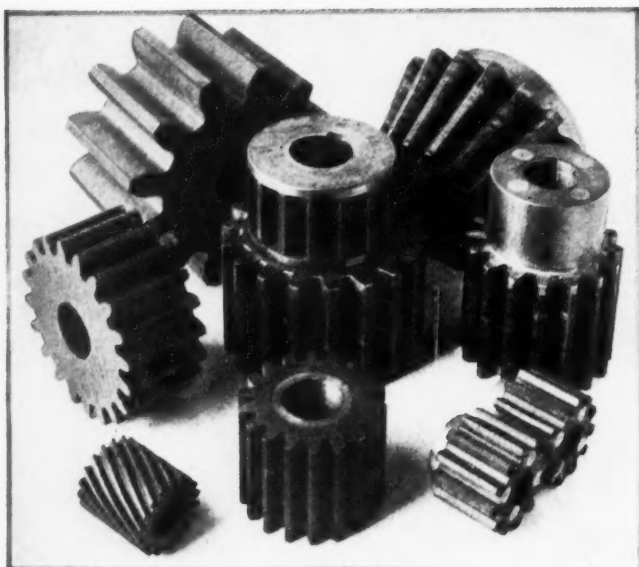
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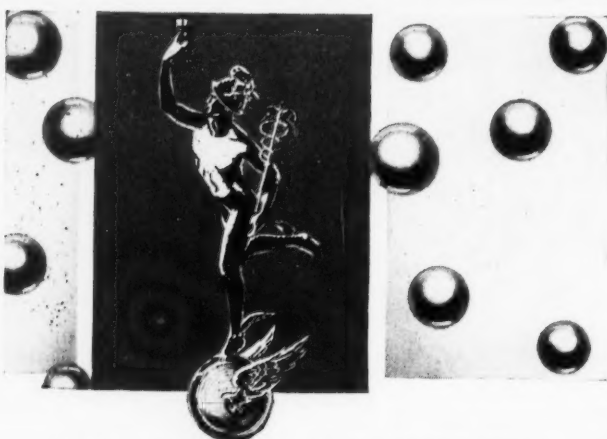
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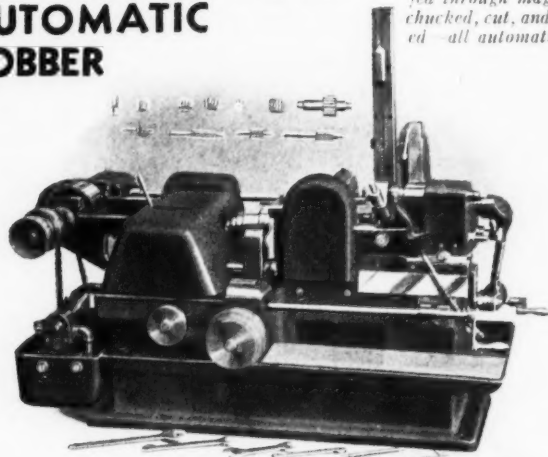
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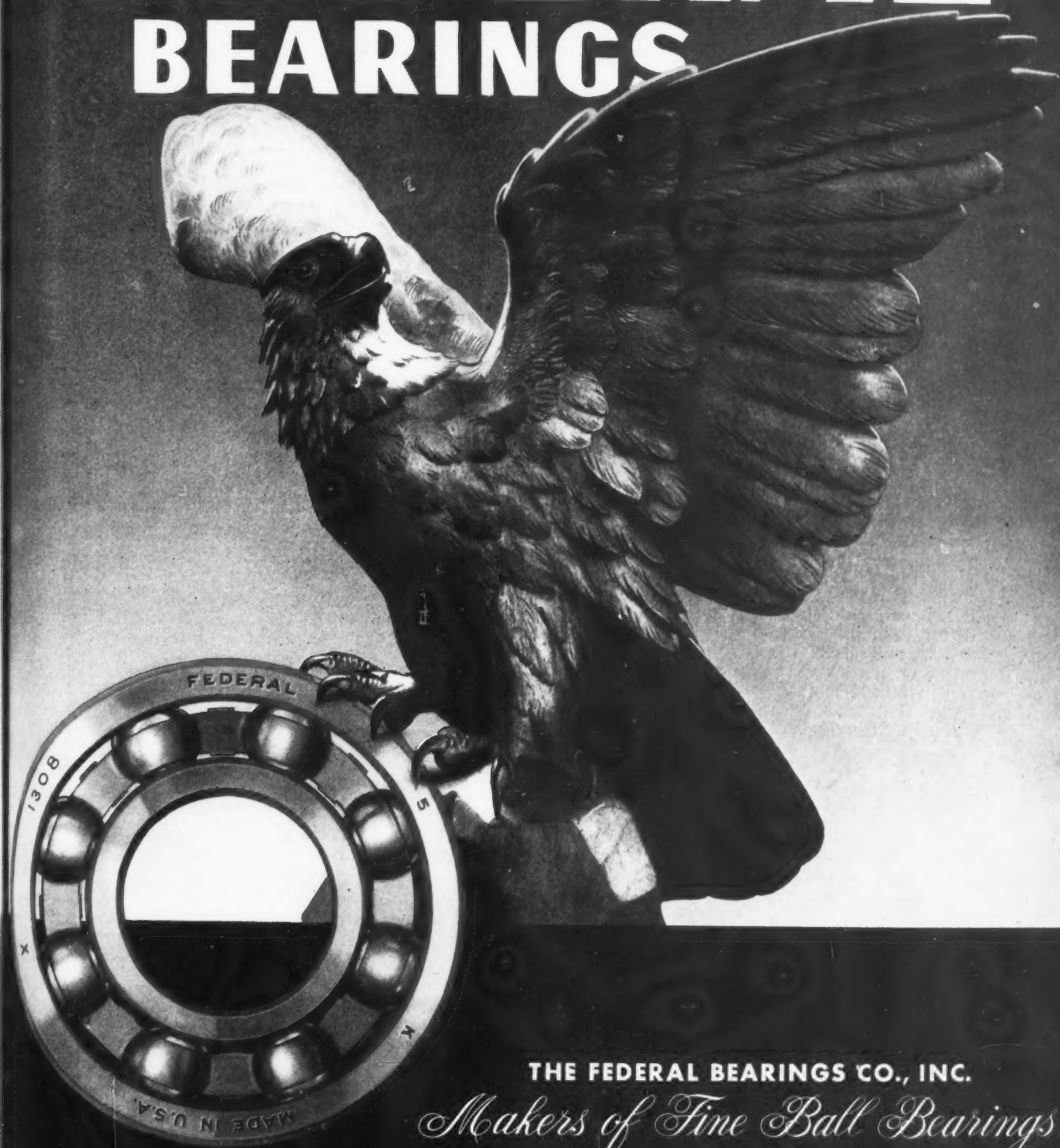
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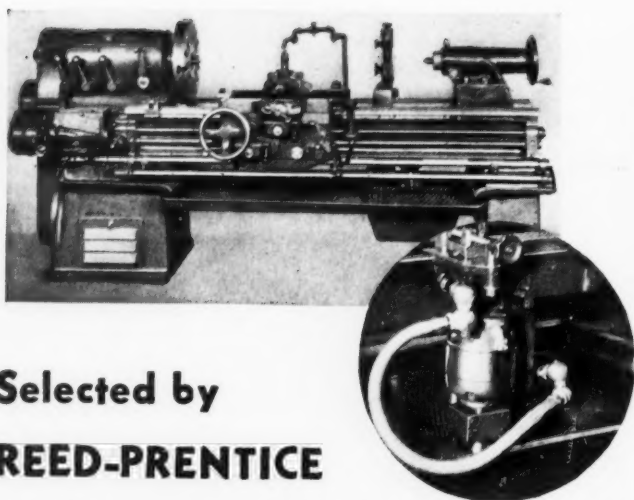


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In Pittsburgh

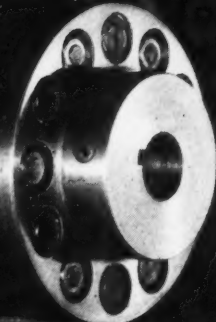
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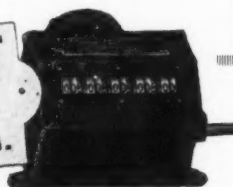
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 Sight glass in shank to adjust oil feed to proper volume.
 Self-closing hinge cover for easy filling.

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DIRECT WORM DRIVE ELECTRIC HOIST



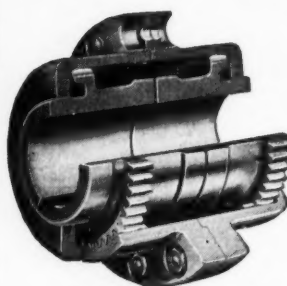
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 A COMPLETE LINE OF CRANES AND HOISTS

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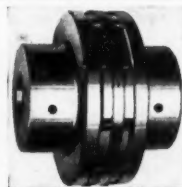
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SOCKET HEAD SET SCREWS

STANDARD PRESSED STEEL CO.

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Fig. 232

Properly heat treated alloy steel makes certain that the points won't round and the hex won't mushroom. Carefully chased threads hold the screws in place even under the most severe conditions. Get the full facts—send for a copy of the new "Unbrako" Catalog.

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Designed for Milling and Drilling Machines and are especially adapted for any work where a large number of pieces are to be quickly handled. **MADE IN THREE SIZES.**



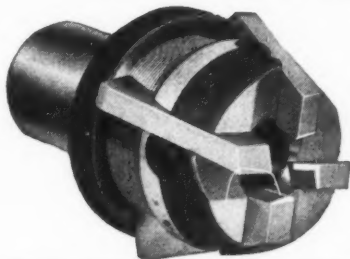
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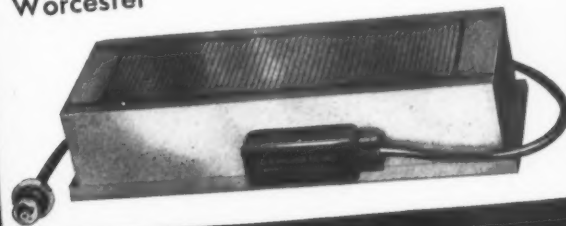
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Thor

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STRONG-ARM JOE SAYS:



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PRONOUNCED
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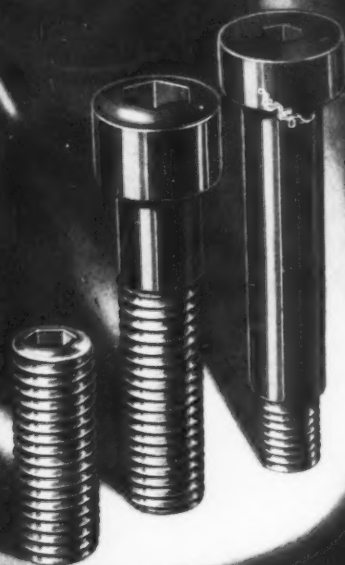
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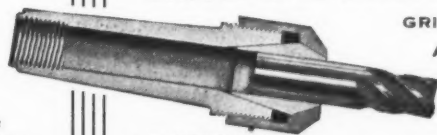
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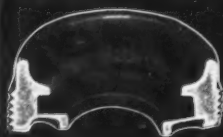


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CONCENTRIC
WITHIN .001

FOR
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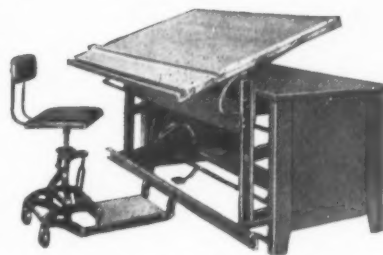
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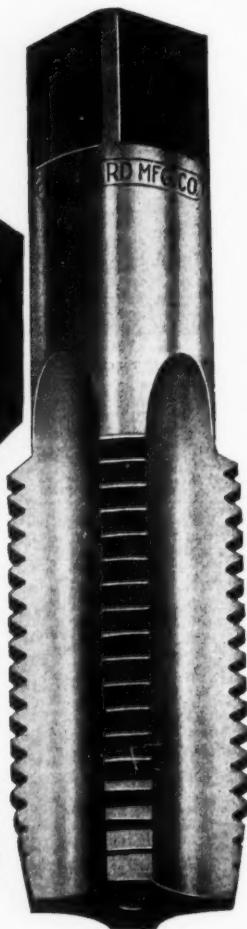
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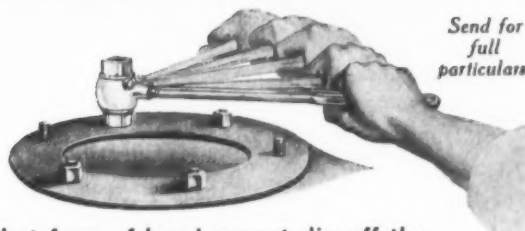


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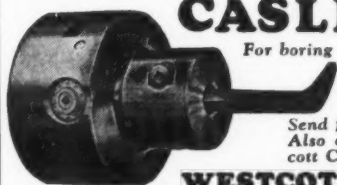
A TIME-SAVER

Can be used in narrower places than an ordinary wrench. Each head can turn two different-sized nuts—one in each end.

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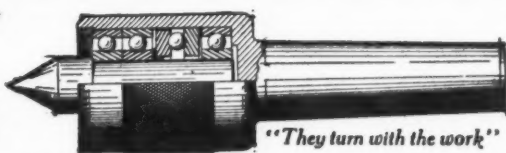


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Bright Finish—Zinc Coated
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COLD ROLLED STRIP STEEL

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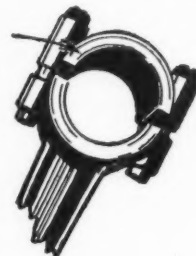


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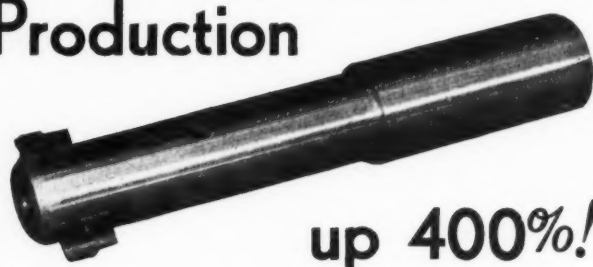
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MACHINERY, August, 1937—127



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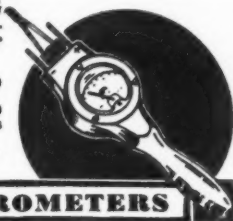
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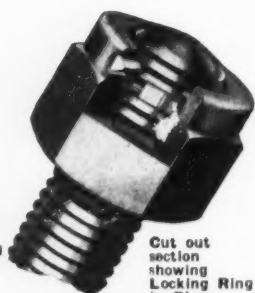


Fig.
1510

Cut out
section
showing
Locking Ring
in Place.

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BOX 22

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a man
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with
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wrench

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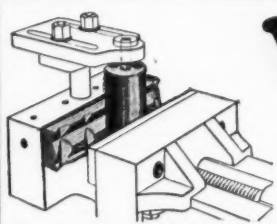


Fig. 3. V-Jaw Holds Round Work
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For Drill Press. Often used on
MILLER, SHAPER or PLANER.

Jaws 6', 9' and 12' Long

Flanged around bottom for bolting down,
with three slots at large end, not shown.



Fig. 2.
Without Jig
Attachments



Face While Boring

M-D Facing Head can be at-
tached to Column Boring Bar,
and Drilling or Milling Machine
spindles. Single point tool travels
radially, from center outward or
reverse, feeds automatically, and
covers faces 6" to 30". Write
for prices.

MUMMERT-DIXON COMPANY
HANOVER, PA.



FIXTURES . . . Time-Saving, Money-Saving
fixtures, planned by Columbus Engineers, have in-
creased production efficiency in all types of plants.
See what they can do for you.

Send in your requests
— no obligation.

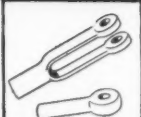
**JIGS — TOOLS — DIES
SPECIAL MACHINERY**

THE COLUMBUS DIE, TOOL & MACHINE CO., COLUMBUS, O.



SPRING WASHERS

Spring washers and lock washers of every type and size, including the well-known Hipower and Kantlink types. There are thousands of more places where spring washers would improve the value of any product where bolts, nuts, cap or machine screws are used.



STEEL ROD ENDS

Drop forgings including steel rod ends of the adjustable yoke, plain yoke, and eye types. These articles in standard sizes and threads afford tremendous savings over special designs.



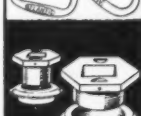
RETAINING RINGS

Spring retaining rings of special heat-treated spring steel are carried in many stock sizes—both open and closed types. Use of a spring retaining ring is an excellent manner of creating a shoulder on a shaft.



CONTAINER HANDLES

Forged steel handles for heavy containers—can be rigidly welded, riveted or attached by a strap to lie flat when not in use. Rugged and most satisfactory for hard usage.



STEEL BARREL CLOSURES

Forged and machined fittings for steel barrels, drums, tanks and metal packages, including plugs, rings and flanges. Very rugged for use in transportation of alcohol, turpentine, oils and other expensive liquids.



RHEOSTATS—RESISTORS—LOAD BOXES AND SPECIAL APPARATUS

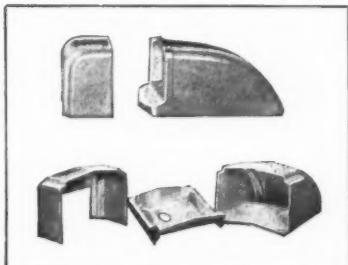
Our electrical division—Hardwick, Hindle, Inc.—makes as fine electrical resistance products, fixed and variable, as can be devised.

Other products include windows for buses and railway cars, railway car window curtains, curtain rollers and fixtures, wash locks and lifts.

THE NATIONAL LOCK WASHER COMPANY
NEWARK, N.J.—EXPORT DIV., 15 E. 26 ST., N. Y. C.

BETTER METHODS

BETTER DIE CASTINGS



THE SUPERIOR DIE CASTING CO.
17325 Euclid Ave., CLEVELAND, OHIO
Cincinnati Chicago Pittsburgh Detroit New York

Famous for quality of threads they produce, long life of chasers and all-around dependability.

Following literature available:

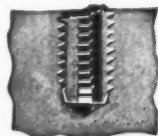
Bulletin on H & G General Purpose Die Heads.
Bulletin on new Insert Chaser Type of Die Head.
Bulletin on H & G Threading Machines.

See our Advt., page 220, April Machinery.
The Eastern Machine Screw Corp.
23-43 Barclay Street, New Haven, Conn.
Los Angeles: A. C. Behringer, 312 Commercial St.,
Los Angeles, Cal. San Francisco: A. H. Coates
Company, 1142 Howard St., San Francisco, Cal.



Die Heads

A WALTON TAP EXTRACTOR WILL SAVE THE PIECE



Remove the broken tap EASILY and QUICKLY with a Walton. It saves the piece—and also the thread. All sizes—3/16" to 1 1/4"; other sizes to order. Write for Cat. No. 114.

THE WALTON COMPANY
92 ALLYN ST., HARTFORD, CONN.

A.E.F. WELDING METHODS MACHINE DETAILS

EXPOSED!

- Correct design must be supported by correct materials.
- Take copper for example.
- In electric welding machines it performs the function of arteries carrying working blood stream of electric current.
- Copper castings can be made from scrap copper, "doped" to look right, but they cannot act right; they cost one third less.
- High conductivity copper must be made from an electrolytic copper ingot, and all adulterants must be tabooed. . .
- Admixture of only slight percentage of silicon, or phosphorus makes casting jobs easy for the foundry, but it ruins "conductivity," or the ability of copper to carry current without excessive heat losses. . .
- Moral: You may pay less for welding equipment from some manufacturers, but the goods and results will be in proportion, to the price you pay.

A.E.F.* Machines are built on honor.

*Always Efficiently Functioning

WANT WELDING DATA?
We Will Help You—

AMERICAN ELECTRIC FUSION CORPORATION

2606-2622 DIVERSEY AVENUE

CHICAGO



This advertisement prepared by Commercial Advertising Agency Inc., Chicago

How Your Advertising Department Can Do A Bigger Job

Is your Advertising Department prepared to meet the challenge of today's complex conditions . . . to live up to its new opportunities . . . to assume broader responsibilities? Has it the training, the vision and the courage to do more than a routine job?

How your Advertising Department can do a bigger job will be the principal theme of the 15th Annual NIAA Industrial Advertising and Sales Promotion Conference and Exposition at the Edgewater Beach Hotel, Chicago, September 22 to 24, 1937. There will be talks by nationally known industrial leaders . . . by sales executives . . . and advertising directors. There will be speaking sessions, round table discussions, clinics on numerous specific topics, extensive exhibits of advertising and sales promotion materials, and rare opportunities for person to person exchange of ideas.

Are You a Top Executive?

This conference offers you a composite of management's experience with respect to industrial marketing trends . . . distribution practice . . . and directing Advertising and Sales Promotion Departments not only to sell merchandise, but also to do the urgent job of

improving public relations. It will be a highly profitable investment for you to attend with your Sales Manager and your Advertising Manager.

Are You a Sales Director?

In addition to the foregoing, the NIAA conference offers you information on the most effective sales promotion policies and practices . . . the coordination of advertising with personal sales activities.

Are you an Advertising Manager?

From this conference, you will get inspiration . . . a broader viewpoint . . . a new vision of your opportunities, as well as "brass tack" information about various details of advertising and sales promotion.

An Ideal Convention Spot

The Edgewater Beach Hotel, the convention site illustrated above on the shores of Lake Michigan, offers unparalleled opportunities for fun and recreation . . . bathing, an abbreviated golf course, night clubs, etc. This conference, sponsored by the National Industrial Advertisers Association, will afford ample opportunity for entertainment, as well as work. *Mail Coupon Below.*

NIAA

• • 15TH ANNUAL
ADVERTISING AND
SALES PROMOTION
CONFERENCE AND
EXPOSITION

SEPTEMBER 22, 23, 24, 1937
EDGEWATER BEACH HOTEL, CHICAGO

MR. H. D. PAYNE, Chicago Molded Products Co.
2145 W. Walnut St., Chicago, Ill.

Please send further information about the program of the 1937 Conference and Exposition, sponsored by the National Industrial Advertisers' Association

Name.....

Company.....

Address.....

NATION-WIDE CLEANING DIGEST

*Published monthly by Oakite Products, Inc. for executives responsible
for improving production methods and lowering unit costs.*

VOLUME I

AUGUST 1937

NUMBER VIII

Increase

New car registration in first five months of this year showed increases of more than 10% over corresponding 1935 period.

Did You Know This?

That in value of products produced, meat packing is the Nation's first industry

Class I Railroads Know Good Thing

Over 40% of Class I railroads use Oakite materials because they help increase efficiency, save time and money on all types of maintenance work.

Utility Company Saves Coal

Sludge and algae growth from river water accumulated on water side of large condenser with 8,185 one inch tubes, each 21 feet long. Recommended Oakite material and method removed deposits and enabled them to operate condenser 1,000 hours instead of 700 hours, as previously. Records compiled by plant engineer show substantial savings effected in coal consumption. Cleaning of condenser required less frequently.

Preventing Corrosion and Oxidation in Re-circulating Air Conditioning Systems

If your plant has installed an air-conditioning system of the re-circulating type, a new development known as OAKITE AIREFINER will, at low cost, help you keep equipment in good condition, by preventing slime formation, clogging of spray heads. It also prevents or minimizes corrosion or oxidation of equipment surfaces. Want details?

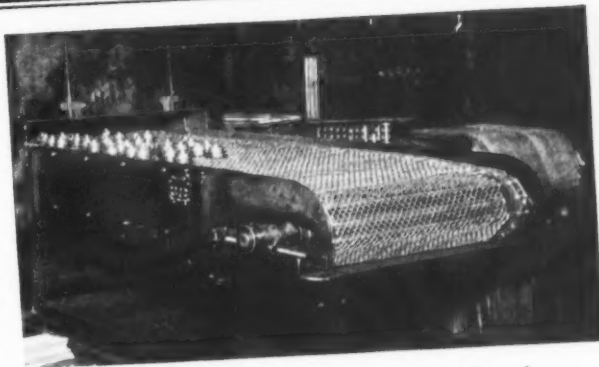
Want to Know Name of Mfr.?

Built to drive all screws from No. 4 to 12, a one-hand electric screw driver that is now available, has all the weight concentrated at the operator's hand, giving the unit perfect balance.

Easy to Remove Fingermarks from Stainless Steel

If you fabricate products from stainless steel such as kitchen ranges, dairy equipment, railroad coaches, there is available a specially developed Oakite

material for removing fingermarks, light oils, etc., before shipment of units to your distributors or users. It gives equipment a splendid, clean appearance. Easy to apply and use. Details gladly sent on request.



Get ALL It Can Give You!

Your metal washing machine is designed to give you consistent, trouble-free performance. Make sure you get ALL it can give you in SPEED, ECONOMY and day-after-day EFFICIENCY by taking advantage of the fast, thorough cleaning action of Oakite materials.

Wherever cleaning is done in automatic washing machines, you will find that you can keep pace with the fastest production schedule, get the MOST cleaning, at lowest cost, if you use the recommended Oakite material for your work.

If you're seeking better results, fewer rejects, more economical cleaning, let us help you. Write today . . . no obligation.

OAKITE

Industrial Cleaning Materials and Methods

Manufactured only by

OAKITE PRODUCTS, INC.

26 Thames St.

NEW YORK, N. Y.

Changed Mind About Gasoline

Certain types of grease and oil resisted ordinary method of removal in this plant which brassplates bolts and nuts. Then they resorted to gasoline but found it too dangerous. And results were very unsatisfactory. Finally an Oakite Service Man was called in and

now everything is different. Fire and explosion hazards are gone. Work is thoroughly, quickly cleaned and cost of doing it surprisingly low. Further, they get a fine, bright color on bolts, just what they want, simply by changing over to an Oakite material. If you have a similar problem, let us help you.

CLASSIFIED AND RE-SALE

Rates for Advertisements—\$5.25 Column Inch Each Insertion

High Grade Used and Rebuilt Machine Tools

LATHES

50"x30" Draper Cone Drive
42"x20" American Geared Head, A.C., M.D.
36"x18" Bridgeford Geared Head
36"x14" Boye & Emmes Cone Head Lathe
36"x36" LeBlond Trip. Grd., Q.C.
24"x10" Greaves Klusman Grd. Hd.
18"x8" Lehmann Grd. Hd., S.P.D.
26"x14" Bridgeford Grd. Hd., S.P.D.
24"x12" Lodge & Shipley 3 step cone drive

RADIALS AND UPRIGHT DRILLS

2 1/2", 3", 3 1/2", 6" Cintl. Bick. S.P.D.
3, 4, 5 & 6" American Triple Purpose, S.P.D.
24" Cincinnati Bickford Upright, Tapping.
No. 50 Nattoo Straight Line Multiple

GEAR CUTTERS AND HOBBERS

6" Gleason Bevel Gear Generators
No. 1 Schuchardt & Schutte
18-H Gould & Eberhardt Hobbers
No. 3-36, No. 6-60 Brown & Sharpe
Automatic Gear Cutters, S.P.D.
No. 6 Fellows Gear Shapers

BORING MILLS

24" Bullard "Rapid Production"
No. 1 Barrett Horizontal
No. 2 Barrett Horizontal
36" Rapid Production

SHAPERS AND PLANERS

16", 20" & 24" Gould & Eberhardt, high duty
26"x26"x8" Cleveland Openside
24"x6" Gray

MILLING MACHINES

No. 3 Kempamith Cone Drive, Plain
No. 3 LeBlond H.D., Plain
No. 3 Kempamith Universal, Cone
No. 4 Cincinnati High Power, Cone Drive
No. 4 Cincinnati Universal, three step cone
No. 12 Brown & Sharpe Mfg. Millers
24" Cincinnati Automatic

GRINDERS

Nos. 50, 55, 60, 65 and 70 Healds
No. 2 Brown & Sharpe Surface
No. 2 Diamond Surface, M.D., late type
10"x52" Landis Self Contained

MISCELLANEOUS

1/2" Dbl. Spin. Landis Bolt, Lanco Hds.
Lead Screw, Arr. M.D.
2" Landis Single spindle, Cone drive
2 1/2" Landis Bolt Cutter, Lead Screw

If machines you need are not listed above, send us your inquiry. We have a very large stock.

Cincinnati Machinery & Supply Co.
217 E. Second St., Cincinnati, Ohio

UNUSUAL TOOLS

BROACH, American, 12 ton, vert. hyd.
GRINDER, Helm Centerless, M.D.
GRINDERS, No. 84 Gardner, dbie. disc, opposed type, automatic feed, M.D. (2)
GRINDERS, No. 72 Heald, Hyd., Int. (3)
GRINDERS, No. 13 B. & S. Univ. (3)
PLANNER, O.S., 30" x 30" x 10" Liberty, M.D.
PLANNER, 60" x 80" x 12" N.B.P., box table
SAW, Thiel No. 3, M.D.
SHAPER, 20" Gould & Eberhardt, M.D.
SHEARS, 3' to 10', 16 ga. to 3/8" cap. (8)
SLOTTERS, 16" and 20" Sellers & Betts
PRESS, 609 Hamilton, Double Crank, T.R.

AND A COMPLETE STOCK OF UP-TO-DATE REBUILT EQUIPMENT

HARVEY GOLDMAN & CO.
Machinery
10567 Gratiot Ave., Detroit, Mich.

GOOD REBUILT TOOLS

GRINDERS

No. 72A5 Heald Plain Internal, 2 motor drive
No. 11 Giddings & Lewis Teromatic, 3 mtr. dr.
No. 1 Landis Internal, belt drive
No. 3 Bryant Semi-Automatic Hole Grinder, M.D.
No. 70 Heald Internal, belt drive
No. 3 Brown & Sharpe Universal, belt drive
No. 4 Landis Universal, belt drive
No. 2, 3 Wilmarth & Morman Auto. Surf., belt
No. 78 Wilmarth & Morman Auto. Surf., M.D. in base
No. 3 Brown & Sharpe Planer Type Surface, belt
No. 33 Abrasive Vertical Surface, M.D. in base
12" Pratt & Whitney Vertical Surface, M.D.
18"x48" Diamond Light Duty Face, M.D.
60" Springfield Automatic Face, M.D.
60" Bridgeport Automatic Face, M.D.
No. 2 Oesterlein Universal Tool and Cutter, belt
No. 21, 31, 41 Oliver Drill, M.D.
No. 4, 14, 120 Gardner Disc, belt
No. 24—53" Gardner Horizontal Disc, M.D.
20x144" Landis Plain Self-Cont. Cylind. M.D.
6x18" 10x24" 10x30" 10x36" 12x36" 12x52" 12x72" 16x36" 16x52" 16x72" Landis Plain Self-Cont. Cylindrical, M.D.
No. 14—size 10x18" Brown & Sharpe Plain Cylindrical, belt
No. 11—6x32" Brown & Sharpe Plain Cylindrical, belt
6x32" 10x36" 10x50" 10x72" 12x72" 16x36" Norton Plain Cylindrical, belt drive
12x36" Cincinnati Plain Cylindrical, belt

PLANERS

36"x42"x10" Ingersoll Planer Type Milling Machine, M.D., 1 head on rail, 1 side head
48"x42"x8" Ingersoll Planer Type Slab Milling Machine, M.D.
24" Coulter Open Side Crank Planer, S.P.D.
30"x30"x10" American, 1 head
36"x36"x10" Niles-Bement-Pond Heavy Pattern, M.D., 2 heads
36"x36"x12" Niles, M.D., 4 heads
42"x42"x12" Niles-Bement-Pond Heavy Pattern, 4 heads, reversing motor drive
48"x48"x14" Niles-Bement-Pond, 3 heads, reversing motor drive
48"x48"x15" Niles-Bement-Pond, 4 heads, reversing motor drive

ROLLS AND SHEET METAL MACHINERY

12" Niles, 1 1/4" cap., belt drive
20" Niles, 1" cap., engine drive
90" Bertsch, 3/16" cap., belt
No. 0-62" Niles & Jones Plate Straightening, M.D., 3/16" cap.
No. 2 Southwark Rotary Shear, M.D., cap. No. 8 steel
Southwark Rotary Shear, S.P.D., 36" throat, cap. 3/8"
8" Bliss Power Squaring Shear, 3/4" cap., belted M.D.
10" Stoll Power Squar. Shear, cap. 3/16" M.D.
No. 184 Dreis & Krump Brake, cap. 8"—10 ga., M.D.
74" Bertsch Bending Rolls, 5/16" cap.

ENGINE LATHES

42"x20" Putnam Geared Head, M.D.
36"x29" Johnson, 5 step
36"x11" American, 4 step
30"x20" American Geared Head, 12 speed
30"x14" Lodge & Shipley Patent Head
30"x14" Lodge & Shipley, 5 step
30"x11" American, 5 step
25" raised to 32"x12" LeBlond, 3 step
24"x12" Schumacher-Boye, 3 step
24"x12" LeBlond, 5 step
24"x11" Chard, 4 step

More than 1500 machines in stock. Send us your inquiries.
Now located in our new 11 acre rebuilding plant at Tennessee Ave. and Paddock Road

THE EASTERN MACHINERY CO. 1006 TENNESSEE AVE. CINCINNATI, OHIO

QUALITY TOOLS

BOLT HEADERS, No. 1 SDSS and No. 3 SDSS Waterbury Farrel
BOLT TRIMMERS, Nos. 1 and 2 Waterbury Farrel
BOLT TRIMMER, No. 5C Manville
HORIZONTAL MILL, 3" No. 5 Defiance
VERTICAL MILL, 60" Gisholt
PRESS, No. 5A Bliss toggle draw
PRESS, 600 ton Cleveland coining
MILLER, Nos. 2, 3 and 4 Cincinnati
MILLER, UNIV. No. 1 1/2 Rockford
MILLER, VERT. No. 2 Brown & Sharpe
SHAPER, 16" and 24" Gould & Eberhardt
SLOTTER, 20" Betts heavy, M.D., P.R.T.
TAPPERS, Nos. 1, 2, 2X and 2 BG Garvin
UPSETTERS, 1", 1 1/4", 4" and 5" Ajax

2000 Tools in Stock. Send for List.
MILES MACHINERY CO.
SAGINAW, MICH.

24"x10" Schumacher-Boye, 3 step
24"x10" Lodge & Shipley, D.C. motor drive
24"x10" Greaves-Klusman, 3 step
24"x10" Boye & Emmes, M.D.
24"x10" American, 3 step
24"x8" Hendey Yoke Head
22"x10" Lodge & Shipley Selective Hd., S.P.D.
20"x12" Lodge & Shipley Patent Head
20"x10" LeBlond, 3 step
20"x10" Hendey Geared Head, M.D.
20"x10" Hendey Yoke Head
20"x10" Boye & Emmes, 3 step
20"x10" American, 3 step, taper
20"x6" Hendey Geared Head, M.D.
20"x6" Hendey Yoke Head
18"x10" Reed-Prentice Geared Head, M.D., taper
18"x10" Lodge & Shipley Patent Head
18"x8" Lodge & Shipley Selective Head
18"x8" Greaves-Klusman, 3 step
16"x14" Lodge & Shipley Selec. Hd., M.D., taper
16"x12" Prentice Geared Head, M.D.
16"x10" LeBlond, 3 step
16"x6" Hendey Geared Head, M.D.
16"x6" Hendey Yoke Head, taper
14"x8" Reed-Prentice Geared Head, M.D.
14"x8" Lodge & Shipley, 3 step
14"x6" Hendey Geared Head, M.D.
11"x4" South Bend, M.D.

MILLING MACHINES

No. 2M Cincinnati Vertical, Timken Bearings, National Standard Spindle, M.D. in base
No. 4 Cincinnati Vertical, M.D., National Standard Spindle, Timken Bearings, latest type
No. 6 Becker Vertical, cone
No. 2 Cincinnati High Power Plain, M.D.
No. 3B Milwaukee Plain, M.D., double overarm
No. 2 H.D. LeBlond Plain, cone
No. 3 4 Cincinnati Plain, cone
No. 3 Kempamith Plain, cone
No. 3 Hendey-Norton Plain, cone
No. 13B Brown & Sharpe Plain, S.P.D., National Standard Spindle
No. 3—24" Cintl Hydromatic, M.D., latest type
24" Cincinnati Pl. Auto., M.D., Nat. Standard
24" Cincinnati Duplex Automatic, M.D.
24" Cincinnati Duplex Automatic, belt
No. 33 Kempamith Mfg., S.P.D.
48" Cincinnati Plain Automatic, spur drive
48" Cincinnati Plain Automatic, worm drive
6x90" Pratt & Whitney Thread, M.D.
48" Oesterlein Tilted Offset, M.D., Timken Bearings, National Standard Spindle, M.D., latest
Ingersoll Vertical Miller, M.D., 40" rotary table
C66A Newton 3 spindle Continuous Miller, 48" dia. table

RADIAL DRILLS

4' Morris Plain, gear box
3' Fostick, gear box drive
3' American, M.D. on arm
2 1/2" Carlton H.S. Sensitive, belt
3' Carlton H.S. Sensitive, M.D.
3 1/2" Carlton H.S. Sensitive, M.D.
4' Hammond Jack Knife, M.D.
4' American Triple Geared, M.D.
4' American Triple Geared, M.D.
5' Cincinnati Bickford Universal, M.D.
5' Reed-Prentice Plain, M.D.
5' Bickford Plain, M.D.
6' Dreses Universal, M.D.
7' Fostick Plain, cone

BORING MILLS

2 1/2" bar Cleveland Horizontal gear box drive
5 1/2" Niles, 2 heads
30" Gisholt, 1 head, belt
36", 42" Bullard R.P. Type, 2 hds. on rail, belt
36" Colburn, gear box, 2 heads
37" Niles Vertical, 2 heads, M.D.

Late Model—Immediate Delivery

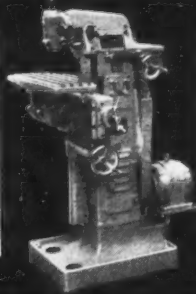
No. 21 Lucas Horizontal Boring Mill
2 1/2" bar Cleveland Horizontal Boring Mill
3 1/2" bar Universal Boring Mill
No. 2 Cincinnati Plain Miller, Timken Bearings, standard Taper, motor base
Model B, 14" Pratt & Whitney Surf. Grinder
3' American Triple Purpose Radial M.D.
No. 3G Hendey Universal Miller (like new)
No. 1A Brown & Sharpe Universal Miller
42" x 60" King Vertical Boring Mills
Warner & Swasey Turret Lathes
Lathes, all sizes and lengths
Leland Gifford, Avey and Allen Drills, Power Feeds.

WIGGLESWORTH MACHINERY CO.
199 Bent St., Cambridge, Mass.

VERSATILE

MILLS
DRILLS
BORES
REAMS
SHAPES
SLOTS

at any angle—
horizontal and
vertical.



MILLER

UNIVERSAL

TOOLS
JIGS
GAUGES
MOLDS
DIES
PUNCHES

Write for Modern
Milling Machine
Booklet.

SHAPER

Experienced Tool and Die Production Engineers prefer the
DECKEL TOOL ROOM MILLER FP1
because of its flexibility and simplicity of operation
H. P. PREIS ENGRAVING MACHINE CO.
157 SUMMIT STREET, NEWARK, N. J.

DIE-CASTING

A complete treatise dealing with die-casting machines, the design of dies, and die-casting alloys. 300 pp., \$3 per copy. Sent on approval.

MACHINERY, 148 Lafayette St., New York.

Out of This

We Made This



BEFORE



AFTER

RE-CUT WITHOUT ANNEALING or altering the original temper. Spirals, side mills, plain mills, end mills, metal saws and high speed hack saw blades, made as good as new. Send a trial order and let us demonstrate.

We recut old files as good as new

CHICAGO TOOL RECLAIMING COMPANY
162 West Austin Avenue CHICAGO, ILL., U. S. A.



USE LAYOUT FLUID

for general machine shop and tool room use on dies, jigs, fixtures, and machined parts.

With the use of the die blue layout fluid, you do not have to polish the surface of work. Simply wipe surface fairly clean and brush on. DRIES INSTANTLY.

Write for free shop sample on your letterhead.

DAYTON ROGERS MFG. CO., MINNEAPOLIS, MINN.

— CLASSIFIED and RE-SALE SECTION —

WANTED ASSISTANT SUPERINTENDENT

Real opportunity and permanent position with long established, highest standing, machinery manufacturer for high grade production man 35-40 who can get best out of men and good at training new men.

Must be graduate mechanical engineer, and good mechanic, with proven ability as leader and organizer in production work. Salary to start \$400.00 and bonus after three months.

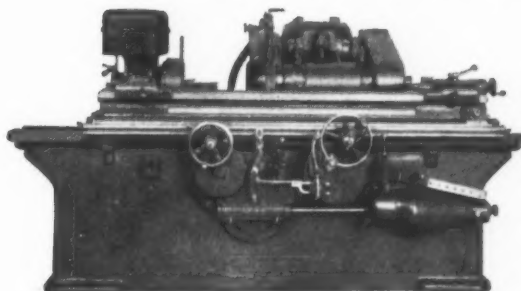
Must know thoroughly machine shop, sheet metal and plate shop operations and preferably with foundry experience. Must be capable in due time of taking full responsibility for efficient and economical production. Our own organization has been advised of this ad.

Plant located in beautiful city of thirty thousand in Middle Atlantic State, employing 500 men and thoroughly modern in every way.

No consideration whatever will be given to applicants whose qualifications are in any way short of the requirements as fully enumerated above.

In your first letter, give age, education, places and period employed, duties, salary in each case, reason for changes and send photograph. All replies will be held in absolute confidence and no one communicated with until permission is granted. Address Box 202, care **MACHINERY, 148 Lafayette St., New York.**

"MOTOR DRIVEN" NORTON GRINDERS



10" x 50" Norton Plain Grinder, Motor Drive

Now In Our Stock:—

6" x 32"	10" x 36"	10" x 96"	14" x 72"	18" x 96"
10" x 18"	10" x 50"	14" x 36"	16" x 50"	18" x 120"
10" x 24"	10" x 72"	14" x 50"	18"-30" x 96"	18" x 144"

Send for "Green List" Just Issued

HILL-CLARKE MACHINERY CO.

641 WASHINGTON BLVD., CHICAGO

USE THIS CLASSIFIED PAGE

— for seeking positions or looking for good mechanical and technical men.

— for selling your service to the industries of the metal-working field.

Rate \$5.25 Column Inch

Horizontal Hydraulic Press — 300 Ton

4' x 35' working capacity; with pump, tank and controls. A1 shape. Price right.

SANDUSKY FOUNDRY AND MACHINE CO.
SANDUSKY, OHIO

Angle and Ratio at a Glance

0 to 90 degrees. Each angle and all relative ratios at a glance. Transparent—Serviceable—Pocket Size. Be a better Mechanic, Engineer or Supervisor. Eliminate setups, profiles, guess work and time. Postpaid \$1.00. 10-day money back guarantee.

ANGLE AND RATIO INSTRUMENT CO.
N.J.C. P. O. Box 1750, Cleveland, O.

Priced Right for Quick Sale

(4) Potter & Johnston No. 6A Turret Lathes and Tools
(2) Barber-Colman No. 12 Gear Hobbers
(1) 36" Bullard Boring Mill M.D.
(1) No. 3B Lapointe Broaching Machine
(1) 18x8 Rockford Economy OGC Lathe
(1) 6" Millband Metal Cutting Band Saw
ROSENFELD MACHINERY CORP.
950 W. Lake Street CHICAGO, ILL.

Let us Design your Form Tools and Cams

for all types of automatic and handscrew machines. Experienced designers and can give prompt service. Box No. 199, care **MACHINERY, 148 Lafayette St., New York City.**

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BROACH**
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NEW LONDON, CONN.

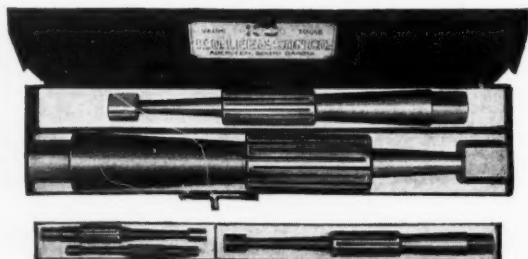
We have been making fine broaches for the past 17 years. We have built up a vast store of practical experience in the application of broaching to low cost production machining of an infinite variety of parts. Further than this we have applied new metallurgical and broach making advances in developing broaches that far surpass in durability, cutting ability and all-round performance even the best of the older types.

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in one small box

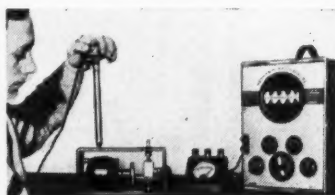
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ABERDEEN, S. D.



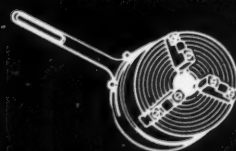
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EXACT Wave Form of
Mechanical Motion*

**Model 156 SUNCO Inertia
Type Crystal Vibration Pickup . . .**

Used in connection with Model 151 Neobeam Oscilloscope for production testing of electric motors, fans, ball-bearings, gear trains, etc.; locating source of vibration in reciprocating and rotating machinery; checking relative smoothness of surfaces; longitudinal rods for fracture; and relative efficiency of materials for deadening sound. Hundreds of other applications. Extremely sensitive, low cost, efficient instrument. Write for 8 page technical bulletin.

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LOVEJOY TOOL CO., INC.
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TURNING, BORING AND MILLING.
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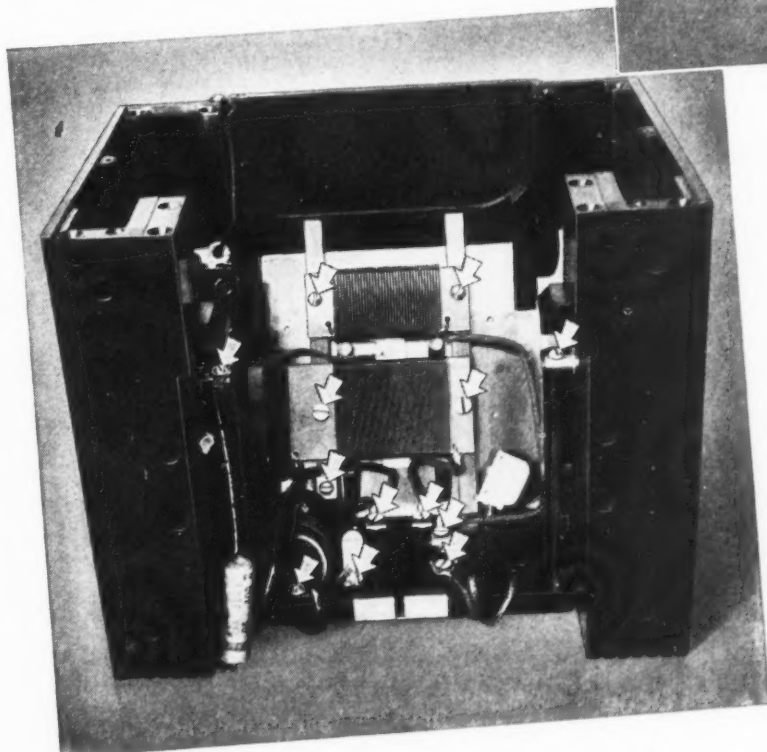
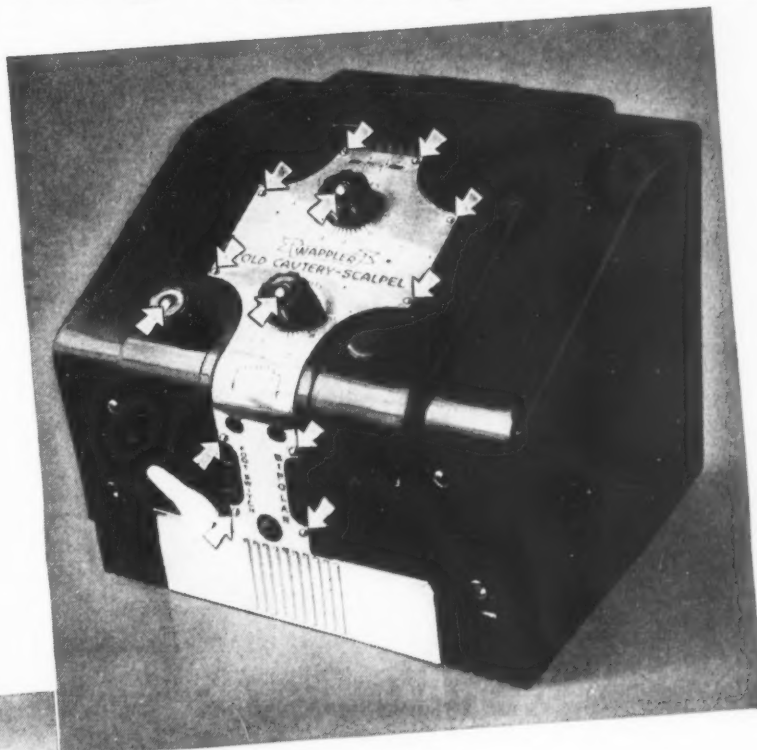


THE ORIGINAL
**BARKER WRENCHLESS
CHUCKS**
2-JAW AND 3-JAW
THOMAS HOIST CO.
24 So. Hoyne Ave., CHICAGO

An Assembly Method that helped MAKE "A \$250 PRODUCT" TO SELL AT \$85 should be worth investigating for your work

AT ONE TIME doctors had to pay from \$250. to \$700. for a Cold-Cautery-Scalpel. Now they can get this efficient and reliable "Wappler" instrument for only \$85. Even the country practitioner can own one since American Cystoscope Makers, Inc., applied mass production principles and intelligent thought to the design of such equipment.

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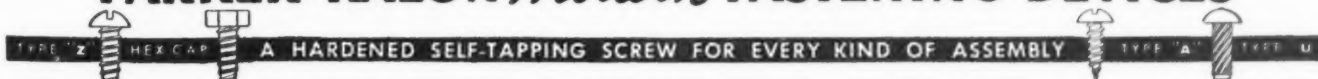
unique Screws hold more securely than machine screws in either inserts or tapped holes." It is no wonder that this manufacturer says—"Now when an assembly is to be made on any of our products we first consider Hardened Self-tapping Screws."

Let us help you investigate this cost-cutting method of assembling metal and plastics

On your own work it is likely that fastening jobs could be simplified and economies effected by using Hardened Self-tapping Screws in place of ordinary devices. In 7 out of 10 cases where metal or plastic assemblies are required this method can be used to advantage for all or part of the fastenings. A Parker-Kalon Assembly Engineer will call on request to go over your fastenings with you and point out all opportunities. A letter to us obtains this service without obligation.

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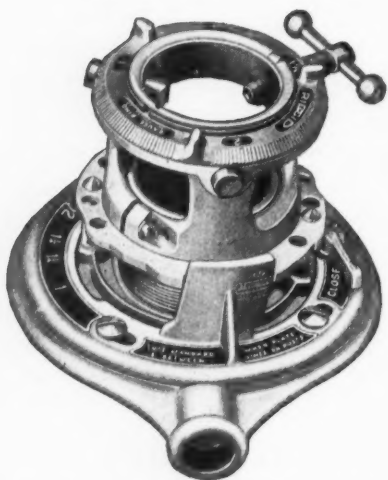
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SOLD ONLY THROUGH RECOGNIZED DISTRIBUTORS

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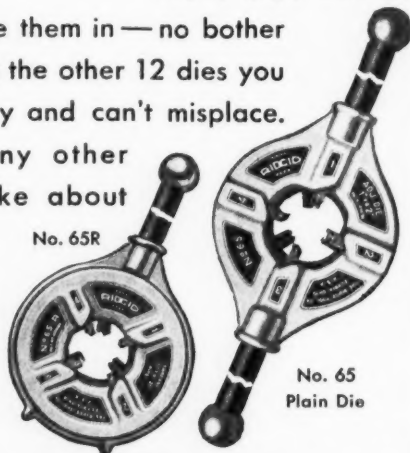
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Shift the setting post (a matter of an instant) and this **RIDGE** No. 65R is ready to thread 1" or 1/4", 1 1/2" or 2" pipe — without changing dies, with perfect accuracy in every thread variation. One set of

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There are many other features you'll like about the **RIDGE** No. 65R. Write for the descriptive folder, or see it at your jobber's.



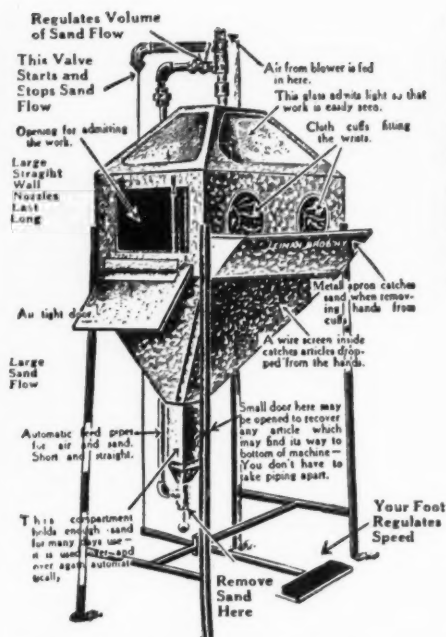
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Would you like to stop 75% of your pipe wrench repairs and wrenches out of commission? Buy **RIDGE**s — housings are guaranteed not to break or warp.

138—MACHINERY, August, 1937

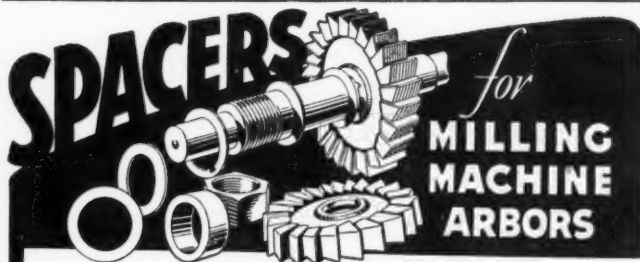


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Simple to Operate — Inexpensive

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MAKERS OF GOOD MACHINERY FOR 50 YEARS



De-Sta-Co Arbor Spacers can be used many times over, and each time save more than the original cost. Spacers for all standard arbor sizes, .001 to .125 thickness. Specials up to 3" thick. Identification marks and keyways as ordered. Send for Price List No. 35.

Trial Assortment—enough for average use on one machine—sent for \$1.00. Specify size of arbor.

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"HEAT-EASY" Compound

Prevents Scaling and Distortion in Hardening
HIGH SPEED STEEL

Also, we do Skilled Hardening and Heat-Treating of every kind, and guarantee the results.

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For batch or continuous heating, heat treating and carburizing. Blowpipes and special burners. In writing, please mention "Machinery."

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**CASTINGS
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SCALE**

for better
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SATIN
FINISHES
UNIFORM
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NO ACIDS

PRODUCT INDEX

For location of advertisements of manufacturers listed
in this index see alphabetical index, pages 153-154

ABRASIVE CLOTH AND PAPER

Behr-Manning Corp., Div. Norton Co., Troy, N. Y.
Carborundum Co., Niagara Falls, N. Y.
Walls Sales Corp., 96 Warren St., New York, N. Y.

ACCUMULATORS, HYDRAULIC

Bethlehem Steel Co., Bethlehem, Pa.
Elmes, Chas. F., Engineering Works, 222 N. Morgan St., Chicago.
Morgan Engineering Co., Alliance, O.

AIR HOISTS

See Hoists, Air.

AIR TOOLS

See Grinders, Pneumatic; Drills, Portable Pneumatic, etc.

ALLOYS, STEEL, TUNGSTEN, VANADIUM, MANGANESE, ETC.

Carboloy Co., Inc., Detroit, Mich.
Carnegie-Illinois Steel Corp. (U.S. Steel Corp. Sub.) Pittsburgh, Pa.
Carpenter Steel Co., Reading, Pa.
Haynes Stellite Co., Kokomo, Ind.
Jesop Steel Co., Washington, Pa.
Ryerson, Joseph T., & Son, Inc., 2558 West 16th St., Chicago, Ill.
Vanadium Alloys Steel Co., No. Chicago, Ill., and Latrobe, Pa.
Van Norman Mch. Tool Co., Springfield, Mass.

ALLOYS, ZINC

New Jersey Zinc Co., 160 Front St., New York City.

ARBOR PRESSES

See Presses, Arbor.

ARBORS AND MANDRELS, EXPANDING AND SOLID

American Broach & Mch. Co., Ann Arbor, Mich.
Brown & Sharpe Mfg. Co., Providence, Cleveland Twist Drill Co., Cleveland, O.
Davis Boring Tool Co., Inc., 6200 Maple Ave., St. Louis, Mo.
Greenfield Tap & Die Corp., Greenfield, Mass.
Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago.
Morse Twist Drill & Machine Co., New Bedford, Mass.
National Twist Drill & Tool Co., Detroit, Mich.
Pratt & Whitney Co., Hartford, Conn.
Standard Tool Co., Cleveland, O.
Union Twist Drill Co., Athol, Mass.

BABBITT

Bealy, Chas. H., & Co., 120-B N. Clinton St., Chicago.
Ryerson, Joseph T., & Son, Inc., 2558 West 16th St., Chicago, Ill.

BALANCING EQUIPMENT

Gisholt Machine Co., Madison, Wis.
Norton Co., Worcester, Mass.
Sundstrand Mch. Tool Co., Rockford, Ill.

BALLS, BRASS, STEEL, ETC.

Auburn Ball Bearing Co., 73 Clarissa St., Rochester, N. Y.
Gwilliam Co., 360 Furman St., Brooklyn, N. Y.
Hoover Ball & Bearing Co., Ann Arbor, Mich.
S K F Industries, Inc., Philadelphia.
Waterbury Steel Ball Co., Inc., Poughkeepsie, N. Y.

BARS, BORING

See Boring Bars.

BARS, PHOSPHOR BRONZE

Bunting Brass & Bronze Co., Toledo, O.

BARS, STEEL

Carnegie-Illinois Steel Co., Pittsburgh, Pa.
Ryerson, Joseph T., & Son, Inc., 2558 West 16th St., Chicago, Ill.

BEARINGS, BABBITT

Bunting Brass & Bronze Co., Toledo, O.
Link-Belt Co., Chicago.

BEARINGS, BALL

Auburn Ball Bearing Co., 73 Clarissa St., Rochester, N. Y.
Bearings Co. of America, Lancaster, Pa.
Boston Gear Works, Inc., North Quincy, Mass.
Ex-Cell-O Corporation, Detroit, Mich.
Fafnir Bearing Co., New Britain, Conn.
Federal Bearing Co., Inc., Poughkeepsie, N. Y.

Gwilliam Co., 360 Furman St., Brooklyn, N. Y.
Hoover Ball & Bearing Co., Ann Arbor, Mich.
Marlin-Rockwell Corp., Jamestown, N. Y.
New Departure Mfg. Co., Bristol, Conn.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
Schatz Mfg. Co., Poughkeepsie, N. Y.
S K F Industries, Inc., Philadelphia.
Torrington Co., Torrington, Conn.

BEARINGS, BRONZE AND SPECIAL ALLOYS

Bealy, Chas. H., & Co., 120-B N. Clinton St., Chicago.
Bunting Brass & Bronze Co., Toledo, O.
Haynes Stellite Co., Kokomo, Ind.
Morgan Engineering Co., Alliance, O.

BEARINGS, LINESHAFT

Fafnir Bearing Co., New Britain, Conn.
Hyatt Roller Bearing Co., Newark, N. J.
Link-Belt Co., Chicago.
Shafer Bearing Corp., 35 East Wacker Drive, Room 2828, Chicago.
S K F Industries, Inc., Philadelphia.

BEARINGS, OILLESS

Arguto Oilless Bearing Co., 145 Berkley St., Wayne Junction, Philadelphia.
Manhattan Rubber Mfg. Div. Raybestos-Manhattan, Inc., Passaic, N. J.

BEARINGS, ROLLER

Fafnir Bearing Co., New Britain, Conn.
Gwilliam Co., 360 Furman St., Brooklyn, N. Y.
Hoover Ball & Bearing Co., Ann Arbor, Mich.
Hyatt Roller Bearing Co., Newark, N. J.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
Shafer Bearing Corp., 35 East Wacker Drive, Room 2828, Chicago.
S K F Industries, Inc., Philadelphia.
Timken Roller Bearing Co., Canton, O.

BEARINGS, TAPERED ROLLER

Timken Roller Bearing Co., Canton, O.

BEARINGS, THRUST

Auburn Ball Bearing Co., 73 Clarissa St., Rochester, N. Y.
Bearings Co. of America, Lancaster, Pa.
Boston Gear Works, Inc., North Quincy, Mass.
Fafnir Bearing Co., New Britain, Conn.
General Electric Co., Schenectady, N. Y.
Gwilliam Co., 360 Furman St., Brooklyn, N. Y.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
Shafer Bearing Corp., 35 East Wacker Drive, Room 2828, Chicago.
S K F Industries, Inc., Philadelphia.
Timken Roller Bearing Co., Canton, O.

BELT FASTENERS, METAL, LEATHER, ETC.

Greene, Tweed & Co., 109 Duane St., New York City.
Manhattan Rubber Mfg. Div. Raybestos-Manhattan, Inc., Passaic, N. J.

BELT SHIFTERS

Haskins, R. G., Co., 4634 Fulton St., Chicago.
Ready Tool Co., Bridgeport, Conn.

BELTING, TRANSMISSION

Houghton, E. F., & Co., Philadelphia, Pa.
Manhattan Rubber Mfg. Div. Raybestos-Manhattan, Inc., Passaic, N. J.

BELTS, V.

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Manhattan Rubber Mfg. Div. Raybestos-Manhattan, Inc., Passaic, N. J.
Wood's, T. B., Sons Co., Chambersburg, Pa.

BENCH LEGS

New Britain-Gridley Mch. Div., New Britain, Conn.
Standard Pressed Steel Co., Jenkintown, Pa.

BENDING MACHINES, ANGLE IRON

Consolidated Machine Tool Corporation, Rochester, N. Y.

BENDING MACHINES, HYDRAULIC

Bethlehem Steel Co., Bethlehem, Pa.
Morgan Engineering Co., Alliance, O.

BLOCKS, CHAIN

See Hoists, etc.

BLOWERS

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Gas Furnace Co., Elizabeth, N. J.
General Electric Co., Schenectady, N. Y.
Leiman Bros., Inc., Newark, N. J.

BLOWERS, PORTABLE ELECTRIC

Ideal Commutator Dresser Co., 1011 Park Ave., Sycamore, Ill.

BOILER TUBES

National Tube Co. (U.S. Steel Corp. Sub.) Pittsburgh, Pa.
Ryerson, Joseph T., & Son, Inc., 2558 W. 16th St., Chicago, Ill.

BOLT AND NUT MACHINERY

Acme Machinery Co., Cleveland.
Landis Mch. Co., Inc., Waynesboro, Pa.
National Acme Co., Cleveland, O.

BOLTS AND NUTS

National Acme Co., Cleveland, O.

BOOKS, TECHNICAL

Industrial Press, 148 Lafayette St., New York.
Lincoln Electric Co., Cleveland, O.

BOOSTERS

American Gas Furnace Co., Elizabeth, N. J.

BORING AND DRILLING MACHINES, VERTICAL

Barnes Drill Co., 814 Chestnut St., Rockford, Ill.
Bullard Co., Bridgeport, Conn.
Gisholt Machine Co., Madison, Wis.
Gorton, Geo., Machine Co., 1109 13th St., Racine, Wis.
Moline Tool Co., Moline, Ill.
Rockford Drilling Machine Co., Rockford, Ill.

BORING AND TURNING MILLS, VERTICAL

Bullard Co., Bridgeport, Conn.
Cincinnati Planer Co., Cincinnati, O.
Consolidated Machine Tool Corporation, Rochester, N. Y.
Gisholt Machine Co., Madison, Wis.
Moline Tool Co., Moline, Ill.

BORING BARS

American Hollow Boring Co., Erie, Pa.
Armstrong Brothers Tool Co., 313 N. Francisco Ave., Chicago.
Bullard Co., Bridgeport, Conn.
Davis Boring Tool Co., Inc., 6200 Maple Ave., St. Louis, Mo.
Gisholt Machine Co., Madison, Wis.
Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago.
Lovejoy Tool Co., Inc., Springfield, Vt.
Madison Mfg. Co., Muskegon, Mich.
McCroskey Tool Corp., Meadville, Pa.
Ready Tool Co., Bridgeport, Conn.
Williams, J. H., & Co., 75 Spring St., New York City.

BORING, DRILLING AND MILLING MACHINES, HORIZONTAL

Bethlehem Steel Co., Bethlehem, Pa.
Consolidated Machine Tool Corporation, Rochester, N. Y.
Harnischfeger Corp., Milwaukee, Wis.
Landis Tool Co., Waynesboro, Pa.
Lucas Mch. Tool Co., Cleveland, O.
Rockford Drilling Machine Co., Rockford, Ill.
Universal Boring Machine Co., Hudson, Mass.

BORING HEADS

Davis Boring Tool Co., Inc., 6200 Maple Ave., St. Louis, Mo.
McCroskey Tool Corp., Meadville, Pa.
Precision Tool Co., Bridgeport, Conn.

BORING HEADS, OFFSET

Precision Tool Co., Bridgeport, Conn.
Westcott Chuck Co., Oneida, New York.

BORING MACHINES, DIAMOND AND CARBIDE TOOLS

Ex-Cell-O Corporation, Detroit, Mich.
Heald Machine Co., Worcester, Mass.
Stokerunit Corp., Milwaukee, Wis.

BORING MACHINES, JIG

Pratt & Whitney Co., Hartford, Conn.

BORING TOOLS

American Hollow Boring Co., Erie, Pa.
Armstrong Brothers Tool Co., 313 N. Francisco Ave., Chicago.
Carboloy Co., Inc., Detroit, Mich.
Davis Boring Tool Co., Inc., 6200 Maple Ave., St. Louis, Mo.

Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago.
Lovejoy Tool Co., Inc., Springfield, Vt.
McCroskey Tool Corp., Meadville, Pa.
Morse Twist Drill & Machine Co., New Bedford, Mass.
Precision Tool Co., Bridgeport, Conn.
Ready Tool Co., Bridgeport, Conn.
Union Twist Drill Co., Athol, Mass.
Williams, J. H., & Co., 75 Spring St., New York City.

BRAKES, PRESS AND BENDING

Cincinnati Shaper Co., Cincinnati.
Schatz Mfg. Co., Poughkeepsie, N. Y.

BRAZING EQUIPMENT

American Gas Furnace Co., Elizabeth, N. J.

BROACHES

Carboloy Co., Inc., Detroit, Mich.
Connecticut Broach & Machine Co., New London, Conn.
Ex-Cell-O Corporation, Detroit, Mich.
Illinois Tool Works, 2501 North Keeler Ave., Chicago, Ill.
Lapointe Mch. Tool Co., Hudson, Mass.
National Broach & Mch. Co., Detroit, Mich.
Oilgear Co., Milwaukee, Wis.

BROACHING MACHINES

American Broach & Mch. Co., Ann Arbor, Mich.
Cincinnati Milling Machine Co., Oakley, Cincinnati.
Foote-Burt Co., Cleveland, O.
Lapointe Mch. Tool Co., Hudson, Mass.
National Broach & Mch. Co., Detroit, Mich.
Oilgear Co., Milwaukee, Wis.
V & O Press Co., Hudson, N. Y.

BROACH SHARPENING MACHINES

Lapointe Mch. Tool Co., Hudson, Mass.

BRONZE

Bunting Brass & Bronze Co., Toledo, O.
Morgan Engineering Co., Alliance, O.

BUFFERS

Black & Decker Mfg. Co., Towson, Md.
Gardner Machine Co., 414 E. Gardner St., Beloit, Wis.
New Britain-Gridley Mch. Div., New Britain, Conn.
Rotor Air Tool Co., Cleveland, O.
United States Electrical Tool Co., Cincinnati, Ohio.
Van Dorn Electrical Tool Co., Towson, Md.

BULLDOZERS

Schatz Mfg. Co., Poughkeepsie, N. Y.

BURNERS, GAS AND OIL

American Gas Furnace Co., Elizabeth, N. J.
Leiman Bros., Inc., Newark, N. J.
Surface Combustion Co., Toledo, O.

BURNISHING MACHINERY

Baird Machine Co., Bridgeport, Conn.

BUSHINGS, BRASS, BRONZE, ETC.

Boston Gear Works, Inc., North Quincy, Mass.
Bunting Brass & Bronze Co., Toledo, O.
Haynes Stellite Co., Kokomo, Ind.
Morgan Engineering Co., Alliance, O.

BUSHINGS, HARDENED

Baumbach, E. A., Mfg. Co., 1810 S. Kilbourn Ave., Chicago.
Danley Machine Specialties, Inc., 2112 South 52 Ave., Chicago.
Leland-Gifford Co., Worcester, Mass.
U. S. Tool Company, Inc., Amper, N. J.

BUSHINGS, JIG

Ex-Cell-O Corporation, Detroit, Mich.
Universal Engineering Co., Frankenth, Mich.

CABINETS, TOOL

Armstrong Brothers Tool Co., 313 N. Francisco Ave., Chicago.
Morse Twist Drill & Machine Co., New Bedford, Mass.

CALIPERS

Brown & Sharpe Mfg. Co., Providence.
Scherr, Geo., Co., 128 Lafayette St., New York City.
Starrett, L. S., Co., Athol, Mass.

CAMS

Hartford Special Mehry. Co., Hartford, Conn.
Kux-Johnner Machine Co., 2145-47 Lexington St., Chicago.
Rowbottom Machine Co., Waterbury, Ct.

CARBIDES, TANTALUM, TITANIUM AND TUNGSTEN

Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Vanadium Alloys Steel Co., No. Chicago and Latrobe, Pa.

CASE-HARDENING

American Gas Furnace Co., Elizabeth, N. J.
American Metal Treatment Co., Elizabeth, N. J.
Surface Combustion Co., Toledo, O.
Williams, J. H., & Co., 75 Spring St., New York City.

CASE-HARDENING FURNACES

See Furnaces, Heat Treating.

CASTINGS, BRASS, BRONZE AND ALUMINUM

Morgan Engineering Co., Alliance, O.

CASTINGS, DIE OR PERMANENT MOLD

Superior Die Casting Co., Cleveland.
Veeder-Root, Inc., Hartford, Conn.

CASTINGS, GRAY IRON

Brown & Sharpe Mfg. Co., Providence.
Link-Belt Co., Chicago.

CASTINGS, MALLEABLE IRON

Link-Belt Co., Chicago.

CASTINGS, STEEL

Link-Belt Co., Chicago.

CEMENT, DISC GRINDING WHEEL

Bealy, Chas. H., & Co., 120-B N. Clinton St., Chicago.
Gardner Machine Co., 414 E. Gardner St., Beloit, Wis.
Hanchett Mfg. Co., Big Rapids, Mich.
Walls Sales Corp., 96 Warren St., New York, N. Y.

CENTERING MACHINES

Hanson-Whitney Machine Co., Hartford, Conn.
Harnischfeger Corp., Milwaukee, Wis.
Pratt & Whitney Co., Hartford, Conn.
Sundstrand Machine Tool Co., Rockford, Ill.

CENTERS, LATHE

Carboloy Co., Inc., Detroit, Mich.
Haynes Stellite Co., Kokomo, Ind.
Modern Machine Corp., 323 Berry St., Brooklyn, N. Y.
Ready Tool Co., Bridgeport, Conn.

CENTERS, PLANNER AND MILLER

Cincinnati Planer Co., Cincinnati, O.
Morse Twist Drill & Machine Co., New Bedford, Mass.

CHAIN BLOCKS

See Hoists, Chain, etc.

CHAIN DRIVES

Boston Gear Works, Inc., North Quincy, Mass.
Link-Belt Co., Chicago.
Whitney Chain & Mfg. Co., Hartford, Conn.

CHAINS, POWER TRANSMISSION AND CONVEYOR

Boston Gear Works, Inc., North Quincy, Mass.
Link-Belt Co., Chicago.
Philadelphia Gear Works, Philadelphia.
Whitney Chain & Mfg. Co., Hartford, Conn.

CHAMFERING MACHINES

Grant Mfg. & Mch. Co., N. W. Station, Bridgeport, Conn.
Schatz Mfg. Co., Poughkeepsie, N. Y.

CHUCKING MACHINES

Baird Machine Co., Bridgeport, Conn.
Bardons & Oliver Inc., Cleveland, O.
Brown & Sharpe Mfg. Co., Providence.
Bullard Co., Bridgeport, Conn.
Gisholt Machine Co., Madison, Wis.
Goss & De Leeuw Machine Co., New Britain, Conn.
Jones & Lamson Machine Co., Springfield, Vt.
National Acme Co., Cleveland, O.
New Britain-Gridley Mch. Div., New Britain, Conn.
Potter & Johnston Machine Co., Pawtucket, R. I.
Sundstrand Machine Tool Co., Rockford, Ill.

CHUCKING MACHINES, MULTIPLE SPINDLE

Goss & De Leeuw Machine Co., New Britain, Conn.
National Acme Co., Cleveland, O.

CHUCKS, AIR-OPERATED

Bardons & Oliver Inc., Cleveland, O.
Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago.
Skinner Chuck Co., New Britain, Conn.
Tomkins-Johnson Co., Jackson, Mich.

CHUCKS, COLLET OR SPLIT

See Collets.

CHUCKS, DIAPHRAGM

Van Norman Mch. Tool Co., Springfield, Mass.

CHUCKS, DRILL

Cleveland Twist Drill Co., Cleveland, O.
Consolidated Mch. Tool Corp. of America, Rochester, N. Y.
Lee, K. O., & Son Co., Aberdeen, So. Dak.
McCrosky Tool Corp., Meadville, Pa.
Modern Tool Works (Consolidated Mch. Tool Corp.), Rochester, N. Y.
Morse Twist Drill & Machine Co., New Bedford, Mass.
National Twist Drill & Tool Co., Detroit, Mich.
Skinner Chuck Co., New Britain, Conn.
Standard Tool Co., Cleveland, O.
Watts Bros. Tool Wks., Wilmerding, Pa.
Westcott Chuck Co., Oneida, New York.

CHUCKS, FULL FLOATING

Errington Mechanical Laboratory, 200 Broadway, New York.
Gisholt Machine Co., Madison, Wis.
Watts Bros. Tool Wks., Wilmerding, Pa.

CHUCKS, LATHE, ETC.

Bullard Co., Bridgeport, Conn.
Hardinge Brothers, Inc., Elmira, N. Y.
Rivett Lathe & Grinder, Inc., Brighton, Boston, Mass.
Skinner Chuck Co., New Britain, Conn.
Thomas Hoist Co., 24 South Hoyne Ave., Chicago.
Westcott Chuck Co., Oneida, New York.

CHUCKS, MAGNETIC

Heald Machine Co., Worcester, Mass.
Walker, O. S., Co., Inc., Worcester, Mass.

CHUCKS, QUICK CHANGE AND SAFETY

Errington Mechanical Laboratory, 200 Broadway, New York.
Geometric Tool Co., New Haven, Conn.
Lee, K. O., & Son Co., Aberdeen, So. Dak.
McCrosky Tool Corp., Meadville, Pa.

CHUCKS, RING WHEEL

Gardner Machine Co., 414 E. Gardner St., Beloit, Wis.
Graham Mfg. Co., Providence, R. I.
Hanchett Mfg. Co., Big Rapids, Mich.

CHUCKS, TAPPING

Barber-Colman Co., Rockford, Ill.
Errington Mechanical Laboratory, 200 Broadway, New York.
McCrosky Tool Corp., Meadville, Pa.
Watts Bros. Tool Wks., Wilmerding, Pa.

CLAMPS

Armstrong Brothers Tool Co., 313 N. Francisco Ave., Chicago.
Bealy, Chas. H., & Co., 120-B N. Clinton St., Chicago.
Danyl Machine Specialties, Inc., 2112 South 52 Ave., Chicago.
Starrett, L. S., Co., Athol, Mass.
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FORGINGS, IRON AND STEEL

American Hollow Boring Co., Erie, Pa.
 Billings & Spencer Co., Hartford, Conn.
 Morgan Engineering Co., Alliance, O.

FORGINGS, UPSET

Bearings Co. of America, Lancaster, Pa.
 Williams, J. H., & Co., 75 Spring St., New York City.

FORMING AND BENDING MACHINES

Bethlehem Steel Co., Bethlehem, Pa.
 Niagara Machine & Tool Wks., Buffalo, N. Y.

FORMING AND STAMPING MACHINES

U. S. Tool Company, Inc., Ampere, N. J.

FOUNDRY EQUIPMENT

Link-Belt Co., Chicago.
 New Britain-Gridley Mch. Div., New Britain, Conn.

FURNACES, HARDNESS

Leeds & Northrup Co., Philadelphia, Pa.

FURNACES, HEAT-TREATING ELECTRIC

General Electric Co., Schenectady, N. Y.
 Leeds & Northrup Co., Philadelphia, Pa.
 Strong, Carlisle & Hammond Co., Cleveland.

FURNACES, HEAT-TREATING OIL, GAS, ETC.

American Gas Furnace Co., Elizabeth, N. J.
 Bardons & Oliver Inc., Cleveland, O.
 Stark Tool Co., Waltham, Mass.
 Strong, Carlisle & Hammond Co., Cleveland.
 Surface Combustion Co., Toledo, O.

FURNITURE, DRAFTING-ROOM

Hamilton Mfg. Co., Two Rivers, Wis.
 New Britain-Gridley Mch. Div., New Britain, Conn.

FURNITURE, SHOP

Hamilton Mfg. Co., Two Rivers, Wis.
 New Britain-Gridley Mch. Div., New Britain, Conn.

GAGE BLOCKS

Ford Motor Co. (Johansson Div.), Detroit, Mich.
 Pratt & Whitney Co., Hartford, Conn.

GAGES, COMPARATOR

Federal Products Corp., Providence.
 Jones & Lamson Machine Co., Springfield, Vt.
 Scherr, Geo., Co., 128 Lafayette St., New York City.

GAGES, DEPTH

Brown & Sharpe Mfg. Co., Providence.
 Federal Products Corp., Providence.
 Starrett, L. S., Co., Athol, Mass.
 Taylor-Shantz, Inc., Rochester, N. Y.

GAGES, DIAL

Ames, B. C. Co., Waltham, Mass.
 Brown & Sharpe Mfg. Co., Providence.
 Federal Products Corp., Providence.
 Scherr, Geo., Co., 128 Lafayette St., New York City.
 Starrett, L. S., Co., Athol, Mass.
 Taylor-Shantz, Inc., Rochester, N. Y.

GAGES, HEIGHT

Brown & Sharpe Mfg. Co., Providence.
 Starrett, L. S., Co., Athol, Mass.

GAGES, PLUG, RING AND SNAP

Brown & Sharpe Mfg. Co., Providence.
 Cleveland Twist Drill Co., Cleveland, O.
 Ex-Cell-O Corporation, Detroit, Mich.
 Federal Products Corp., Providence.
 Ford Motor Co. (Johansson Div.), Detroit, Mich.
 Greenfield Tap & Die Corp., Greenfield, Mass.
 Haynes Stellite Co., Kokomo, Ind.
 Morse Twist Drill & Machine Co., New Bedford, Mass.
 Pratt & Whitney Co., Hartford, Conn.
 Starrett, L. S., Co., Athol, Mass.
 Taylor-Shantz, Inc., Rochester, N. Y.

GAGES, SURFACE

Brown & Sharpe Mfg. Co., Providence.
 Columbus Die, Tool & Machine Co., Columbus, O.
 Starrett, L. S., Co., Athol, Mass.
 Taylor-Shantz, Inc., Rochester, N. Y.

GAGES, TAPER

Ford Motor Co. (Johansson Div.), Detroit, Mich.
 Pratt & Whitney Co., Hartford, Conn.
 Starrett, L. S., Co., Athol, Mass.

GAGES, THREAD

Bath, John, & Co., Inc., Worcester, Mass.
 Brown & Sharpe Mfg. Co., Providence.
 Federal Products Corp., Providence.
 Greenfield Tap & Die Corp., Greenfield, Mass.
 Hanson-Whitney Machine Co., Hartford, Conn.
 Jones & Lamson Machine Co., Springfield, Vt.
 Pratt & Whitney Co., Hartford, Conn.
 Starrett, L. S., Co., Athol, Mass.

GASKETS

Garlock Packing Co., Palmyra, N. Y.
 Greene, Tweed & Co., 109 Duane St., New York City.
 Manhattan Rubber Mfg. Div., Raybestos-Manhattan, Inc., Passaic, N. J.

GEAR BLANKS, NON-METALLIC

Cloves Gear Works, Cleveland, O.
 Ganschow, Wm., Co., Chicago.

GEAR BURNISHING MACHINES

National Broach & Mch. Co., Detroit, Mich.

GEAR CUTTING MACHINES, BEVEL (GENERATOR AND TEMPLET PLANER)

Bilgram Gear & Machine Works, 1217-35 Spring Garden St., Philadelphia.

GEAR CUTTING MACHINES, BEVEL AND SPUR (ROTARY CUTTER)

Brown & Sharpe Mfg. Co., Providence.
 Waltham Mch. Wks., Waltham, Mass.

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Barber-Colman Co., Rockford, Ill.
 Brown & Sharpe Mfg. Co., Providence.
 Scherr, Geo., Co., 128 Lafayette St., New York City.

GEAR CUTTING MACHINES, HELICAL AND SPUR (SHAPER OR PLANER TYPE)

Fellows Gear Shaper Co., Springfield, Vt.

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Barber-Colman Co., Rockford, Ill.

GEAR SHAVING MACHINES

National Broach & Mch. Co., Detroit, Mich.

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Fellows Gear Shaper Co., Springfield, Vt.
Ganschow, Wm., Co., Chicago.
General Electric Co., Schenectady, N. Y.
Grant Gear Works, Inc., Boston, Mass.
Hartford Special Mch. Co., Hartford, Conn.
James, D. O., Mfg. Co., 1120 W. Monroe St., Chicago.

Link-Belt Co., Chicago.
Massachusetts Gear & Tool Co., 34 Nashua St., Woburn, Mass.
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Philadelphia Gear Works, Philadelphia.
Poole Fdry. & Mch. Co., Baltimore, Md.
Scherr, Geo., Co., 128 Lafayette St., New York City.
Stahl Gear & Machine Co., Cleveland.

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Link-Belt Co., Chicago.
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Poole Fdry. & Mch. Co., Baltimore, Md.
Stahl Gear & Machine Co., Cleveland.

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Diefendorf Gear Corp., Syracuse, N. Y.
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Ganschow, Wm., Co., Chicago.
General Electric Co., Schenectady, N. Y.
Grant Gear Works, Inc., Boston, Mass.
Hartford Special Mch. Co., Hartford, Conn.
James, D. O., Mfg. Co., 1120 W. Monroe St., Chicago.
Massachusetts Gear & Tool Co., 34 Nashua St., Woburn, Mass.
Philadelphia Gear Works, Philadelphia.
Stahl Gear & Machine Co., Cleveland.

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White, S. S., Dental Mfg. Co., 10 East 40th St., New York, N. Y.

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McJonegal Mfg. Co., E. Rutherford, N. J.
United States Electrical Tool Co., Cincinnati, Ohio.
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White, S. S., Dental Mfg. Co., 10 East 40th St., New York, N. Y.

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Porter-Cable Machine Co., Salina and Wolf Streets, Syracuse, N. Y.
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Walker-Turner Co., Inc., Plainfield, N. J.
Walls Sales Corp., 96 Warren St., New York, N. Y.

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Black & Decker Mfg. Co., Towson, Md.
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New Britain-Gridley Mch. Div., New Britain, Conn.
Rivett Lathe & Grinder Inc., Brighton, Boston, Mass.
Ryerson, Joseph T., & Son, Inc., 2558 West 16th St., Chicago, Ill.
United States Electrical Tool Co., Cincinnati, Ohio.
Van Dorn Electric Tool Co., Towson, Md.
Walker, O. S., Co., Inc., Worcester, Mass.
Walker-Turner Co., Inc., Plainfield, N. J.

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Norton Co., Worcester, Mass.

GRINDING MACHINES, CEMENTED CARBIDE TOOL

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Ex-Cell-O Corporation, Detroit, Mich.
Oliver Instrument Co., Adrian, Mich.
Stokerunit Corp., Milwaukee, Wis.

GRINDING MACHINES, CENTERLESS

Cincinnati Grinders Inc., Cincinnati.

GRINDING MACHINES, CHASER OR DIE

Eastern Machine Screw Corp., New Haven, Conn.
Geometric Tool Co., New Haven, Conn.
H & G Works, Eastern Machine Screw Corp., New Haven, Conn.
Landis Tool Co., Waynesboro, Pa.

GRINDING MACHINES, CHUCKING

Bryant Chucking Grinder Co., Springfield, Vt.

GRINDING MACHINES, CRANKSHAFT

Cincinnati Grinders Inc., Cincinnati.
Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester, Mass.

GRINDING MACHINES, CUTTER

See Grinding Machines, Tool & Cutter.

GRINDING MACHINES, CYLINDER

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Brown & Sharpe Mfg. Co., Providence.
Cincinnati Grinders Inc., Cincinnati.
Landis Tool Co., Waynesboro, Pa.
Modern Tool Works (Consolidated Mch. Tool Corp.), Rochester, N. Y.
Morse Twist Drill & Machine Co., New Bedford, Mass.
Norton Co., Worcester, Mass.
Pratt & Whitney Co., Hartford, Conn.
Thompson Grinder Co., Springfield, O.
United States Electrical Tool Co., Cincinnati, Ohio.

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Bealy, Chas. H., & Co., 120-B N. Clinton St., Chicago.
Diamond Machine Co., Providence, R. I.
Gardner Machine Co., 414 E. Gardner St., Beloit, Wis.
Hanchett Mfg. Co., Big Rapids, Mich.
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 Union Twist Drill Co., Athol, Mass.

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Abrasive Machine Tool Co., East Providence, R. I.
 Diamond Machine Co., Providence, R. I.
 Hanchett Mfg. Co., Big Rapids, Mich.

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See Flexible Shaft Equipment.

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 Diamond Machine Co., Providence, R. I.
 United States Electrical Tool Co., Cincinnati, Ohio.
 Van Dorn Electric Tool Co., Towson, Md.

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 Union Twist Drill Co., Athol, Mass.

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 Greenfield Tap & Die Corp., Greenfield, Mass.
 Heald Machine Co., Worcester, Mass.
 Landis Tool Co., Waynesboro, Pa.
 Modern Tool Works (Consolidated Mch. Tool Corp.), Rochester, N. Y.
 Rivett Lathe & Grinder Inc., Brighton, Boston, Mass.
 Van Norman Mch. Tool Co., Springfield, Mass.

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Diamond Machine Co., Providence, R. I.
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Heald Machine Co., Worcester, Mass.

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 Van Norman Mch. Tool Co., Springfield, Mass.

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Sundstrand Machine Tool Co., Rockford, Ill.

GRINDING MACHINES, RING WHEEL

Boely, Chas. H. & Co., 120-B N. Clinton St., Chicago.
 Diamond Machine Co., Providence, R. I.
 Gardner Machine Co., 414 E. Gardner St., Beloit, Wis.
 Graham Mfg. Co., Providence, R. I.
 Hanchett Mfg. Co., Big Rapids, Mich.

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Cincinnati Grinders, Inc., Cincinnati.
 Landis Tool Co., Waynesboro, Pa.
 Norton Co., Worcester, Mass.

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Abrasive Machine Tool Co., East Providence, R. I.
 Blanchard Machine Co., 64 State St., Cambridge, Mass.
 Brown & Sharpe Mfg. Co., Providence.
 Diamond Machine Co., Providence, R. I.
 Gallmeyer & Livingston Co., Grand Rapids, Mich.
 Gardner Machine Co., 414 E. Gardner St., Beloit, Wis.
 Hanchett Mfg. Co., Big Rapids, Mich.
 Heald Machine Co., Worcester, Mass.
 Mattison Machine Works, Rockford, Ill.
 Norton Co., Worcester, Mass.
 Pratt & Whitney Co., Hartford, Conn.
 Rowbottom Machine Co., Waterbury, Conn.
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Davis Boring Tool Co., Inc., 6200

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Dumore Co., Racine, Wis.

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Gisholt Machine Co., Madison Wis.

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Racine, Wis.

Landis Tool Co., Waynesboro, Pa.

LeBlond, R. K., Mch. Tool Co., Cin-

cinnati, O.

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Tool Corp.), Rochester, N. Y.

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Mummet-Dixon Co., Hanover, Pa.

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umee St., Adrian, Mich.

Pratt & Whitney Co., Hartford, Conn.

Prela Engraving Machine Co., 157 Sum-

mit St., Newark, N. J.

Sundstrand Machine Tool Co., Rock-

ford, Ill.

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Cincinnati, Ohio.

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High Speed Hammer Co., Inc.,

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HAMMERS, POWER

High Speed Hammer Co., Inc.,

Rochester, N. Y.

HAMMERS, SOFT

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HAMMERS, STEAM

Morgan Engineering Co., Alliance, O.

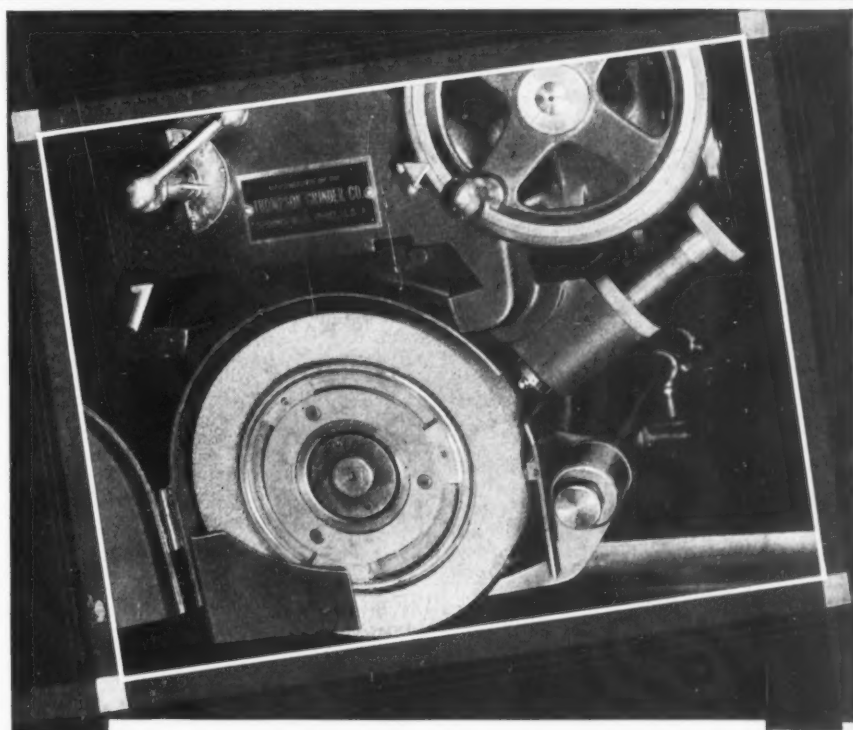
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Wilson Mechanical Instrument Co.,
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beth, N. J.

Bennett Metal Treating Co., Elmwood,
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Davis Boring Tool Co., Inc., 6200
Maple Ave., St. Louis, Mo.

Surface Combustion Co., Toledo, O.

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See Gear Cutting Machine, Helical

and Spur (Hob) and Gear Cutting
Machines, Worms and Worm Wheels
(Hob).

HOBS

Barber-Colman Co., Rockford, Ill.
Brown & Sharpe Mfg. Co., Providence.
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Greenfield Tap & Die Corp., Greenfield,
Mass.

Illinois Tool Works, 2501 North Keeler
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National Twist Drill & Tool Co., De-
troit, Mich.

Union Twist Drill Co., Athol, Mass.

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Harnischfeger Corp., Milwaukee, Wis.
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Shepard Niles Crane & Hoist Corp., 444
Schuyler Ave., Montour Falls, N. Y.

Thomas Hoist Co., 24 South Hoyne
Ave., Chicago.

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Rockford, Ill.

Moline Tool Co., Moline, Ill.

HOSE, RUBBER, METALLIC, ETC.

Manhattan Rubber Mfg. Div., Raybestos-
Manhattan, Inc., Passaic, N. J.

HYDRAULIC EQUIPMENT

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Ave., Chicago.

Morgan Engineering Co., Alliance, O.
Oilgear Co., Milwaukee, Wis.

HYDRAULIC HEAD UNITS

Ex-Cell-O Corporation, Detroit, Mich.
National Automatic Tool Co., Rich-
mond, Ind.

HYDRAULIC MACHINERY AND**TOOLS**

Bethlehem Steel Co., Bethlehem, Pa.

INDEX CENTERS

Abrasive Machine Tool Co., East Provi-
dence, R. I.

Brown & Sharpe Mfg. Co., Providence.

INDICATORS, DIAL

Ames, B. C. Co., Waltham, Mass.

Federal Products Corp., Providence, R. I.

Starrett, L. S. Co., Athol, Mass.

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Scherer, Geo., Co., 128 Lafayette St.,
New York City.

Starrett, L. S. Co., Athol, Mass.

Veeder-Root, Inc., Hartford, Conn.

INDICATORS, TEST

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Federal Products Corp., Providence.

Norton Co., Worcester, Mass.

Starrett, L. S. Co., Athol, Mass.

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Morgan Engineering Co., Alliance, O.

JACKS, PLANER

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Francisco Ave., Chicago.

JIGS AND FIXTURES

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Cleveland Universal Jig Co., Cleveland,
Ohio.

Columbus Die, Tool & Machine Co.,
Columbus, O.

Gisholt Machine Co., Madison, Wis.

Hartford Special Mch. Co., Hartford,
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Manufacturers' Consulting Engineers,
Syracuse, N. Y.

Pratt & Whitney Co., Hartford, Conn.

Ruthman Machinery Co., 534-536 E.
Front St., Cincinnati, O.

Sundstrand Mch. Tool Co., Rockford, Ill.

Taylor-Shantz, Inc., Rochester, N. Y.

KEYSEATERS

Davis Keyseater Co., Rochester, N. Y.

Lapointe Mch. Tool Co., Hudson, Mass.

KNURL HOLDERS

Graham Mfg. Co., Providence, R. I.

Pratt & Whitney Co., Hartford, Conn.

KNURLING TOOLS

Armstrong Brothers Tool Co., 313 N.
Francisco Ave., Chicago.

Pratt & Whitney Co., Hartford, Conn.

Williams, J. H., & Co., 75 Spring St.,
New York City.

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Hoboken, N. J.

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Cincinnati Grinders, Inc., Cincinnati.

Norton Co., Worcester, Mass.

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Cincinnati, O.

Hardinge Brothers, Inc., Elmira, N. Y.

Lodge & Shipley Machine Tool Co.,
Cincinnati, O.

McCroskey Tool Corp., Meadville, Pa.

Rivett Lathe & Grinder, Inc., Brighton,
Boston, Mass.

Seneca Falls Mch. Co., Seneca Falls,
N. Y.

Springfield Mch. Tool Co., 631 South-
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Stark Tool Co., Waltham, Mass.

Sundstrand Mch. Tool Co., Rockford, Ill.

United States Electrical Tool Co., Cin-
cinnati, O.

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Ready Tool Co., Bridgeport, Conn.

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Goss & DeLeeuw Machine Co., New
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Jones & Lamson Machine Co., Spring-
field, Vt.

Lodge & Shipley Mch. Tool Co., Cin-
cinnati, O.

National Acme Co., Cleveland, O.

New Britain-Gridley Mch. Div., New
Britain, Conn.

Porter-Cable Machine Co., Salina and
Wolf Streets, Syracuse, N. Y.

Potter & Johnston Mch. Co., Paw-
tucket, R. I.

Pratt & Whitney Co., Hartford, Conn.

Rockford Machine Tool Co., 2412
Kishwaukee Road, Rockford, Ill.

Sundstrand Mch. Tool Co., Rockford, Ill.

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Rochester, N. Y.

Seneca Falls Machine Co., Seneca Falls,
New York.

Sundstrand Machine Tool Co., Rock-
ford, Ill.

LATHES, BENCH

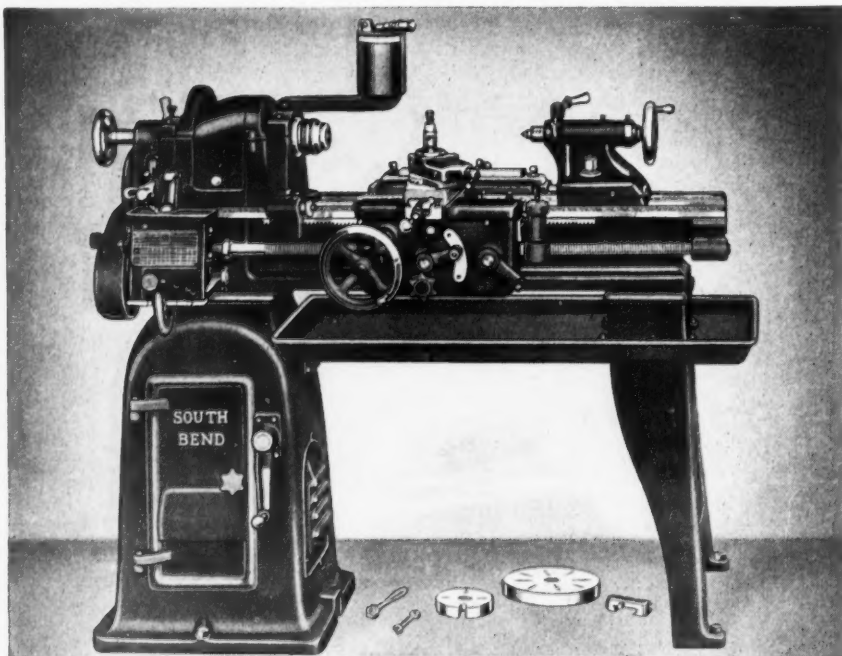
Ames, B. C. Co., Waltham, Mass.

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Warner & Swasey Co., Cleveland.

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See Chucking Machines.

LATHES, TOOLROOM

See Lathes, Engine and Toolroom.

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Madison-Kipp Corp., Madison, Wis.

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See Arbors and Mandrels, Expanding and Solid.

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U. S. Tool Company, Inc., Ampere, N. J.

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Pratt & Whitney Co., Hartford, Conn.

Stark Tool Co., Waltham, Mass.

Sundstrand Machine Tool Co., Rockford, Ill.

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Sundstrand Machine Tool Co., Rockford, Ill.

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Brown & Sharpe Mfg. Co., Providence.

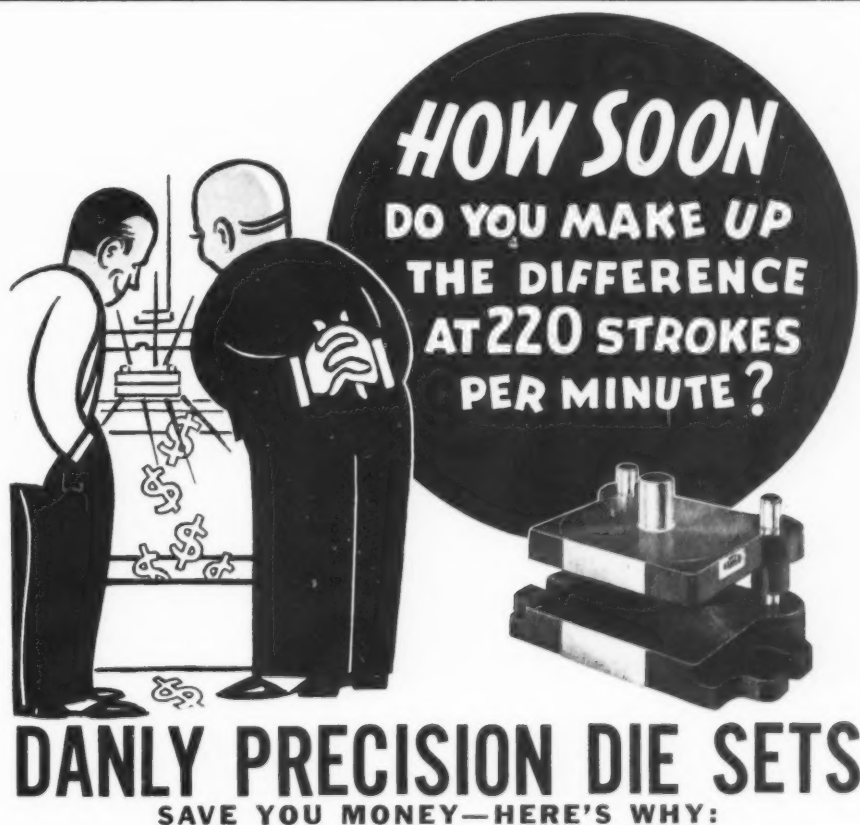
Van Norman Mch. Tool Co., Springfield, Mass.

MILLING MACHINES, HAND

Pratt & Whitney Co., Hartford, Conn.

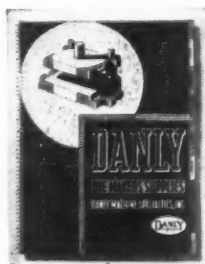
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Lincoln Electric Co., Cleveland.

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Merrell Mfg. Co., Toledo, O.
Murchey Mch. & Tool Co., 951 Porter
St., Detroit.

NUT SETTING EQUIPMENT

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Equipment.

NUT TAPPERS

See Bolt and Nut Machinery.

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Boston Gear Works, Inc., North Quincy,
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Gits Bros. Mfg. Co., 1858 S. Kilbourn
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Texas Co., 135 E. 42nd St., New York.

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OILS, SOLUBLE

See Compounds, Cutting, Grinding, etc.

OSCILLOSCOPE

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Ave., Chicago.

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Linde Air Products Co., The, 30 E.
42nd St., New York.

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Garlock Packing Co., Palmyra, N. Y.

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Manhattan Rubber Mfg. Div., Ray-
bestos-Manhattan, Inc., Passaic, N. J.

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Mass.

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V & O Press Co., Hudson, N. Y.

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Mummert-Dixon Co., Hanover, Pa.
V & O Press Co., Hudson, N. Y.

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Sub.) Pittsburgh, Pa.

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Cincinnati Planer Co., Cincinnati, O.
Consolidated Machine Tool Corporation,
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Rockford Machine Tool Co., Rockford,
Ill.

PLANERS, OPEN SIDE

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Brown & Sharpe Mfg. Co., Providence.
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Rotor Air Tool Co., Cleveland, O.

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Diamond Machine Co., Providence, R. I.
Gardner Machine Co., 414 E. Gardner
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New Britain-Gridley Mch. Div., New
Britain, Conn.
Production Mch. Co., Greenfield, Mass.
United States Electrical Tool Co., Cin-
cinnati, O.
Van Dorn Electric Tool Co., Towson, Md.

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Van Dorn Electric Tool Co., Towson, Md.

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See Hammers, Drop.

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Loshough-Jordan Tool & Mch. Co.,
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Hartford Special Mch. Co., Hartford,
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Massachusetts Gear & Tool Co., 34
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Stahl Gear & Machine Co., Cleveland.

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troit, Mich.

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Gisholt Machine Co., Madison, Wis.

Greenfield Tap & Die Corp., Greenfield,
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McCroskey Tool Corp., Meadville, Pa.

Morse Twist Drill & Machine Co., New
Bedford, Mass.

Pratt & Whitney Co., Hartford, Conn.

Union Twist Drill Co., Athol, Mass.

Wetmore Reamer Co., 412 No. 27th
St., Milwaukee, Wis.

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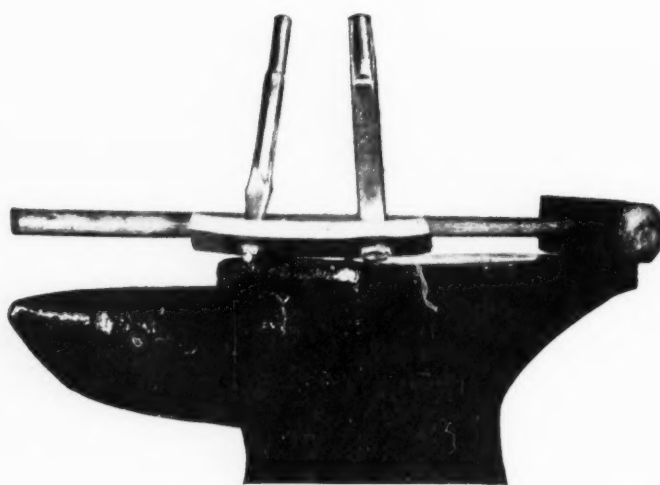
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Barber-Colman Co., Rockford, Ill.
Carpenter Steel Co., Reading, Pa.
Columbia Tool Steel Co., 450 East
14th St., Chicago Heights, Ill.
Firth-Sterling Steel Co., McKeesport, Pa.
Jessop Steel Co., Washington, Pa.
Ryerson, Joseph T. & Son, Inc., 2558
W. 16th St., Chicago, Ill.
Vanadium Alloys Steel Co., No. Chicago,
Ill., and Latrobe, Pa.
Williams, J. H., & Co., 75 Spring St.,
New York City.

TOOL HEADS, ADJUSTABLE

Precision Tool Co., Bridgeport, Conn.
R and L Tools, Nicetown, Philadelphia, Pa.

TOOL HOLDERS

Armstrong Bros. Tool Co., 313 N.
Francisco Ave., Chicago.
Cleveland Twist Drill Co., Cleveland, O.
Gisholt Machine Co., Madison, Wis.
Lovejoy Tool Co., Inc., Springfield, Vt.
R and L Tools, Nicetown, Philadelphia, Pa.
Ready Tool Co., Bridgeport, Conn.
Williams, J. H., & Co., 75 Spring St.,
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Chicago Tool Reclaiming Co., 147 W.
Austin Ave., Chicago.

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Carpenter Steel Co., Reading, Pa.
Columbia Tool Steel Co., 450 East
14th St., Chicago Heights, Ill.
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TOOLS, CARBIDE-TIPPED

Carboloy Co., Inc., Detroit, Mich.
Ex-Cell-O Corporation, Detroit, Mich.
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Vanadium Alloys Steel Co., No. Chicago,
Ill., and Latrobe, Pa.

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PLANNER**

Armstrong Bros. Tool Co., 313 N.
Francisco Ave., Chicago.
Carboloy Co., Inc., Detroit, Mich.
Gisholt Machine Co., Madison, Wis.
Lovejoy Tool Co., Springfield, Vt.
R and L Tools, Nicetown, Philadelphia, Pa.
Ready Tool Co., Bridgeport, Conn.
Williams, J. H., & Co., 75 Spring St.,
New York City.

TRANSMISSION MACHINERY

See Hangers, Shafting, Pulleys, Clutches,
Couplings, Belting, Chains, etc.

TRANSMISSION, VARIABLE SPEED

Columbia Vari-Speed Co., Wheaton, Ill.
Equipment Engineering Co., Minneap-
olis, Minn.
Link-Belt Co., Chicago.
New Departure Mfg. Co., Bristol, Conn.
Oilgear Co., Milwaukee, Wis.
Reeves Pulley Co., Columbus, Ind.

TUBE FLANGING MACHINES

Grant Mfg. & Mch. Co., N. W. Sta-
tion, Bridgeport, Conn.

**TUBE-FORMING AND WELDING
MACHINES**

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Diversey Ave., Chicago.

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Sub.) Pittsburgh, Pa.

**TUBING STEEL AND SEAMLESS
STEEL**

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National Tube Co. (U.S. Steel Corp.
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W. 16th St., Chicago, Ill.
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VALVES, HYDRAULIC

Elmes, Chas. F., Engineering Works,
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V-BELTS

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Manhattan, Inc., Passaic, N. J.

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New Britain-Gridley Mch. Div., New
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Cincinnati Shaper Co., Cincinnati.
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VOLTMETERS

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Columbia Nut & Bolt Co., Inc.,
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Eaton Mfg. Co., Massillon, O.
Hobbs Mfg. Co., Worcester, Mass.
National Lock Washer Co., Newark,
N. J., and Milwaukee, Wis.
Philadelphia Steel & Wire Corp., Ger-
mantown, Philadelphia, Pa.
Positive Lock Washer Co., Newark, N. J.
Spring Washer Industry, 616 Wrigley
Bldg., Chicago, Ill.
Washburn Co., Worcester, Mass.

WASHERS, SPRING

American Nut & Bolt Fasteners Co.,
Pittsburgh, Pa.
Beall Tool Co., East Alton, Ill.
Butcher & Hart Mfg. Co., Toledo, O.
Eaton Mfg. Co., Massillon, O.
Hobbs Mfg. Co., Worcester, Mass.
National Lock Washer Co., Newark,
N. J., and Milwaukee, Wis.
Philadelphia Steel & Wire Corp., Ger-
mantown, Philadelphia, Pa.
Positive Lock Washer Co., Newark, N. J.
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New York City.

WRENCHES, PIPE

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Starrett, L. S., Co., Athol, Mass.
Williams, J. H., & Co., 75 Spring St.,
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WRENCHES, RATCHET

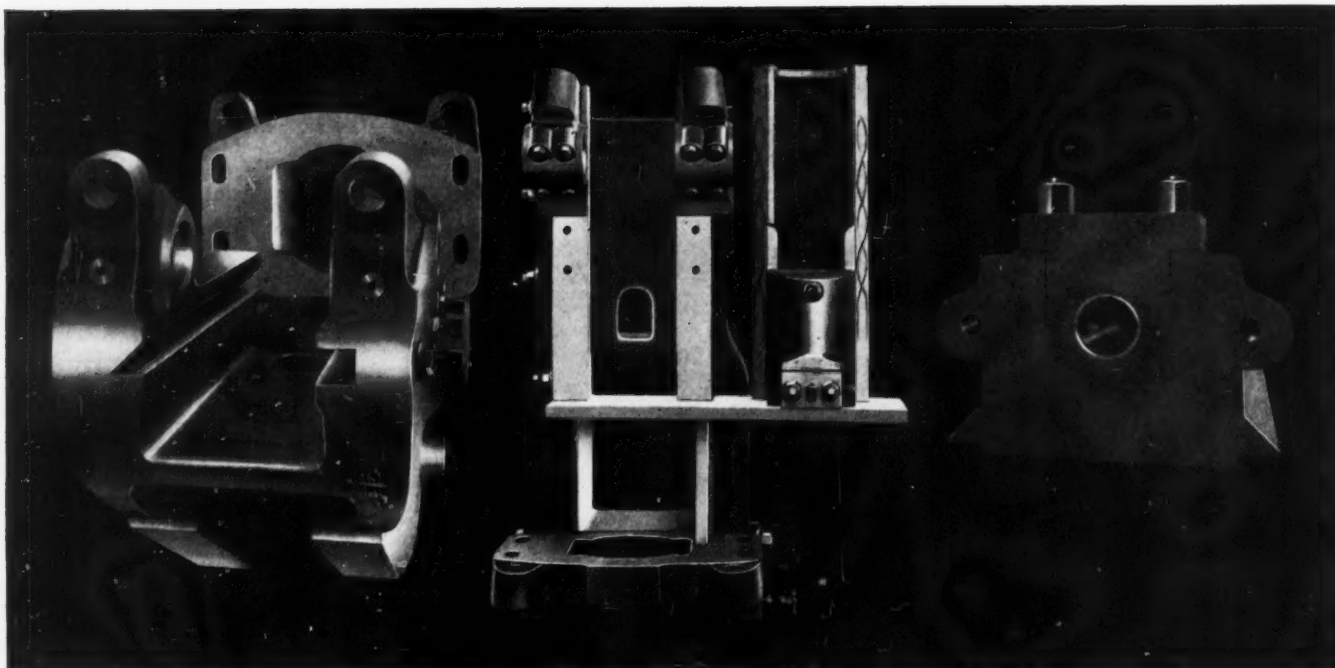
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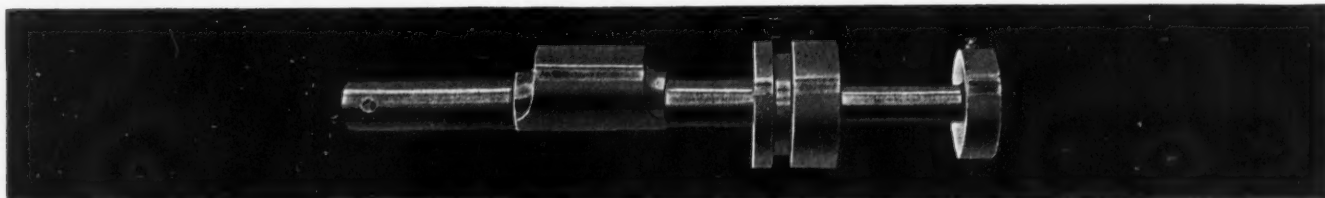
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Morse Twist Drill & Machine Co.,
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Pratt & Whitney Co., Hartford, Conn.
Starrett, L. S., Co., Athol, Mass.

ZINC

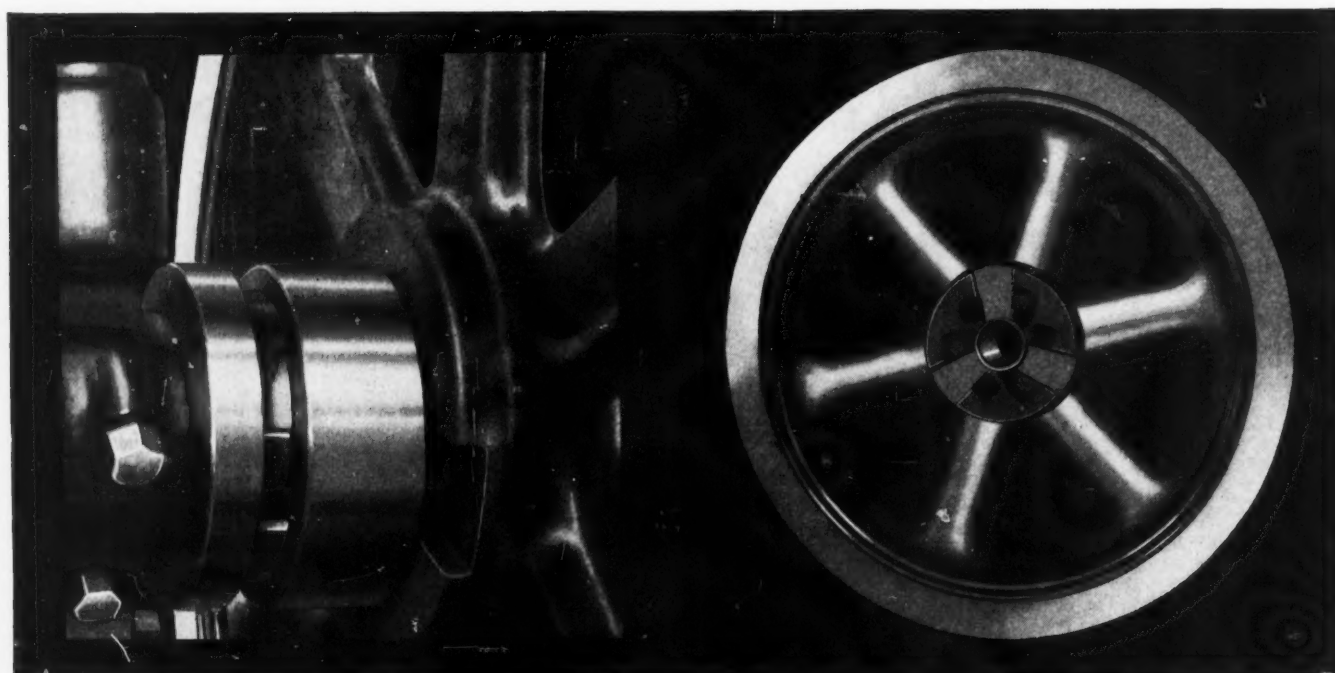
New Jersey Zinc Co., 160 Front St.,
New York City.



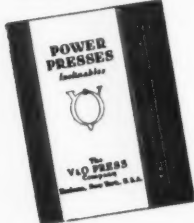
Top View, showing unusually long ways Nearly twice the usual length of slide bearing Bottom view of slide, showing ears



Eccentric-type shaft



Send for Catalog



Note positive stop recess in shaft

Flywheel. Note large diameter of hub

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The National Machine Tool & Supply Co., Minneapolis,
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10 SIZES

THERE'S A **"HIGH SPEED"**
FOR **ANY RIVET**



FROM THIS



TO THIS

1 1/2"

**THE HAMMER WITH
THE HUMAN STROKE**
The Principle is Right

HIGH SPEED HAMMER CO.
333 Norton St., Rochester, N. Y.




AUGUST 1937—FORTY-THIRD YEAR

AGE 4 1937

MACHINERY

THE INDUSTRIAL PRESS Publishers, 140-148 LAFAYETTE ST., NEW YORK

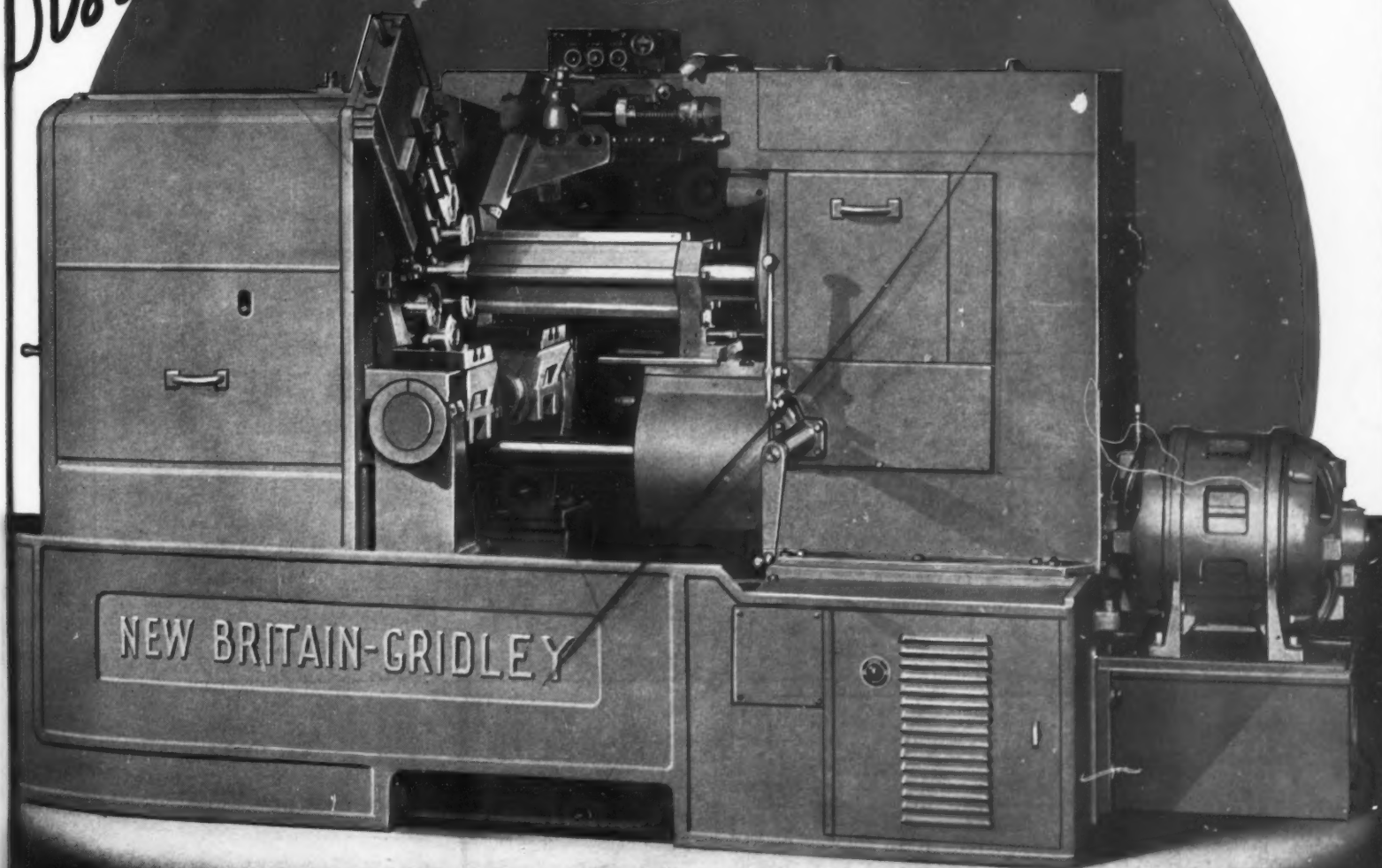
*One of a
Distinguished Line*

61

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Automatic Screw Machines featuring Accuracy
and Permanency of Accuracy

All sizes to 2 1/4" Capacity

MODEL



Also a complete new line of Chuckers — 4 and 6 Spindles up to 9" Capacity

NEW BRITAIN-GRIDLEY MACHINE DIVISION

THE NEW BRITAIN MACHINE CO.

NEW BRITAIN, CONNECTICUT, U. S. A.

"MAXI" WINS BY KNOCKOUT

DUSKY NEWCOMER VICTOR
IN WHIRLWIND BATTLE

1 DRAG HIM OUT. I DIDN'T EVEN WORK UP A SWEAT ON THAT ONE.

THEM TAP BABIES DON'T LAST LONG WITH YOU, BROTHER.

2 HEY! PIPE THIS BLACK BIMBO. ANOTHER SET-UP FOR YOU

BOY, WATCH ME HEAD HIM FOR THE ASH CAN!

3 SO YOU'RE LOOKIN' FOR TROUBLE, EH? WELL, I'M IT!

COME ON, MUG; I'VE LICKED TOUGHER GUYS THAN YOU

4 WHO'S THE DARK HORSE?

SOME BRUISER FROM GREENFIELD

5 FROM NOW ON, I'M RUNNING THIS JOINT. ANY ARGUMENT?

OKE BY ME!

WHAT YOU SAY GOES

GREENFIELD

"Maxi" taps, twist drills and reamers have always "licked" tough production jobs wherever they have been used. Give them a chance in your own plant and profit from their increased efficiency and longer life.

GREENFIELD TAP & DIE CORPORATION

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Detroit Plant: 2102 West Fort Street

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GREENFIELD

McCROSKY TIME-SAVERS CUT COSTS



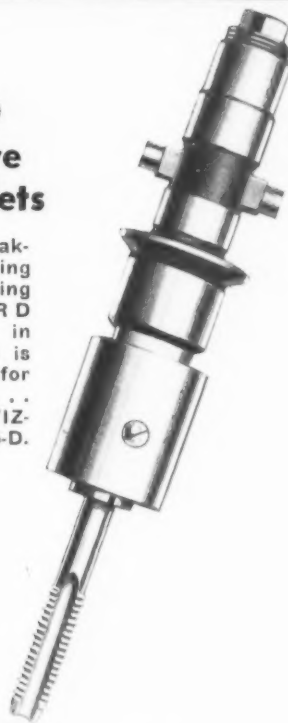
WIZARD Quick-Change Chucks and Collets

Hold tools rigid and centered. Both chucks and collets are hardened and ground . . . A WIZARD Outfit enables a drill press operator to change tools with one hand without stopping or slowing the spindle.



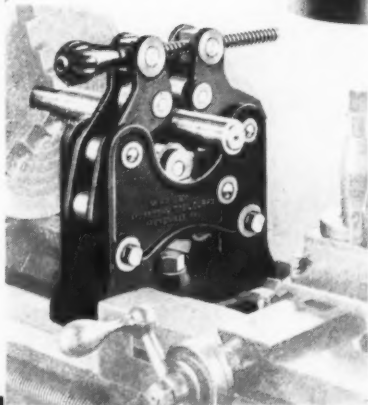
WIZARD Friction-Drive Tapping Collets

Protect taps from breakage and permit tapping blind holes at drilling speed . . . WIZARD Chucks are made in four sizes and there is a WIZARD Collet for every kind of tool . . . Send for complete WIZARD Bulletin No. 15-D.



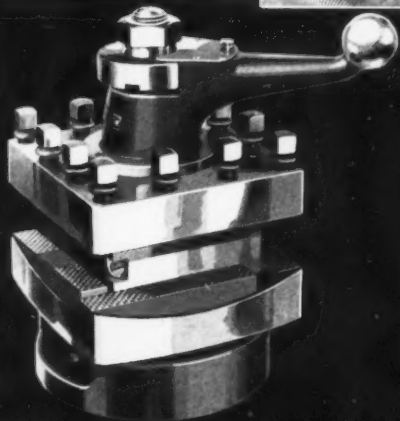
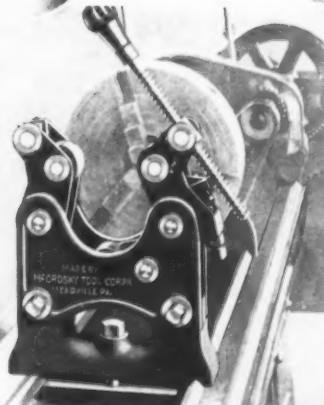
McCrosky Self-Centering Steadyrest

Handles work from $\frac{3}{8}$ " to $3\frac{3}{4}$ " dia. without adjustment.



McCrosky Self-Centering Steadyrest

Detailed information in McCrosky Bulletin No. 14-E.

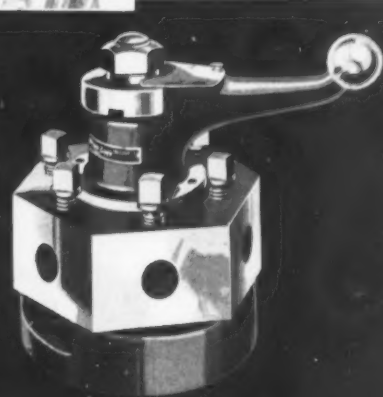


McCrosky Turrets for Modern Lathes

Six Styles and many sizes.

Send for McCrosky Bulletin No. 14-E

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McCROSKY TOOL CORPORATION

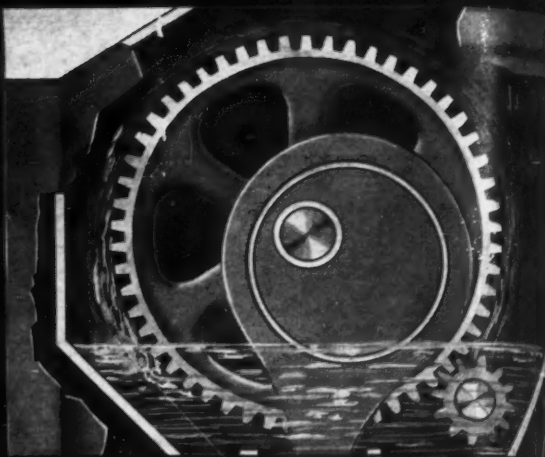
1340-70 Main Street

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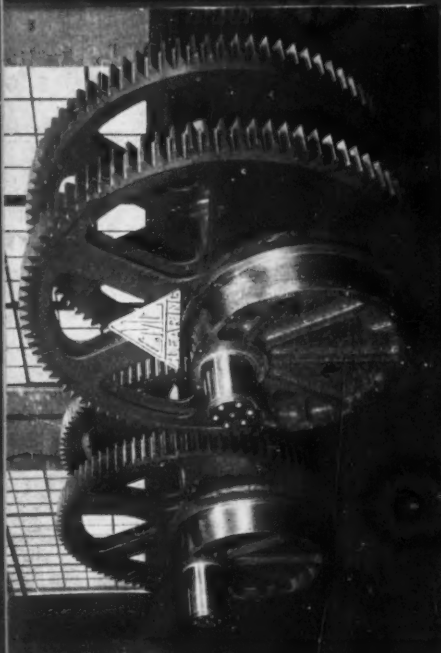
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